DOCUMENT RESUME

ED 050 353 AC 010 346

AUTHOR	Littleton, Lois
TITLE	The Pilot Training Study: A User's Guide to the PILOT Computer Model.
INSTITUTION	Rand Corp., Santa Monica, Calif.
SPONS AGENCY	Department of the Air Force, Washington, D.C.
REPORT NO	RM-6081-PR
PUB DATE	Dec 69
NOTE	71p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Computer Programs, *Educational Programs, *Guides, *Models, *Pilot Projects
IDENTIFIERS	Project RAND: *PILOT Model

ABSTRACT

This Memorandum is a manual or guide for users of the PILOT computer model. Section I is an introductory explanation of the purposes of the model. Section II and III describe the data inputs and program outputs. They provide a listing of a sample input deck and a sample printout of each of the six sets of output data. Section IV is a detailed explanation, illustrated by flowcharts, of the routines involved in entering the data inputs, computing requirements for new pilots and for cross-training of pilots, searching for means by which to fill the requirements, and computing commission training entrants and graduates. The PILOT model program was written in FORTRAN IV. It uses 116K bytes of core on a 360/65 computer. As indicated above, all input data is read from cards and the output is printed. The final section of the Memorandum presents a symbolic listing of the FORTRAN IV computer program. For related documents see AC 010 340-345 and AC 010 347. (Author)

ED050353

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

SCOPE OF INTEREST NOTICE
The ERIC Facility has assigned this document for processing to: AC EM
In our judgement, this document is also of interest to the clearinghouses noted to the right. Indexing should reflect their special points of view.

MEMORANDUM
RM-6081-PR
DECEMBER 1969

THE PILOT TRAINING STUDY: A User's Guide to the PILOT Computer Model

Lois Littleton

PREPARED FOR:
UNITED STATES AIR FORCE PROJECT RAND

The RAND Corporation
SANTA MONICA • CALIFORNIA

AC 010 346

THIS DOCUMENT HAS BEEN APPROVED FOR PUBLIC RELEASE AND SALE; ITS DISTRIBUTION IS UNLIMITED.

ED050353

MEMORANDUM
RM-6081-PR
DECEMBER 1969

THE PILOT TRAINING STUDY: A User's Guide to the PILOT Computer Model

Lois Littleton

This research is supported by the United States Air Force under Project RAND—Contract No. F44620-67-C-0045—monitored by the Directorate of Operational Requirements and Development Plans, Deputy Chief of Staff, Research and Development, Hq USAF. Views or conclusions contained in this study should not be interpreted as representing the official opinion or policy of the United States Air Force.

DISTRIBUTION STATEMENT
This document has been approved for public release and sale; its distribution is unlimited.

The RAND Corporation
1700 MAIN ST. • SANTA MONICA • CALIFORNIA • 90406

This study is presented as a competent treatment of the subject, worthy of publication. The Rand Corporation vouches for the quality of the research, without necessarily endorsing the opinions and conclusions of the authors.

Published by The RAND Corporation

PREFACE

In April 1967, the Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs) formed a Pilot Advisory Committee to study "Pilots as a National Resource." The Committee consisted of the Assistant Secretary and a representative of each of the three Services. Staff members from Rand were invited to attend the early meetings of the Committee. The outgrowth was that the Air Force member requested Rand to accept responsibility for examining the Air Force pilot training process. The objective of the Rand Pilot Training Study was to develop a series of computer models for use in estimating the resources required to produce pilots and the costs of training them. Further, the models were to be designed for sensitivity analyses and long-range planning.

For the convenience of readers whose interests may not extend to all aspects of the pilot training process, the results of the study are presented in eight volumes, as follows:

Volume		
I	RM-6080-PR	The Pilot Training Study: Personnel Flow and the PILOT Model, by W. E. Mooz.
II	RM-6081-PR	The Pilot Training Study: A User's Guide to the PILOT Model, by Lois Littleton.
III	RM-6082-PR	The Pilot Training Study: Precommissioning Training, by J. W. Cook.
IV	RM-6083-PR	The Pilot Training Study: A Cost-Estimating Model for Undergraduate Pilot Training, by S. L. Allison.
V	RM-6084-PR	The Pilot Training Study: A User's Guide to the Undergraduate Pilot Training Model, by Lois Littleton.
VI	RM-6085-PR	The Pilot Training Study: Advanced Pilot Training, by P. J. Kennedy.
VII	RM-6086-PR	The Pilot Training Study: A Cost-Estimating Model for Advanced Pilot Training, by L. E. Knollmeyer.
VIII	RM-6087-PR	The Pilot Training Study: A User's Guide to the Advanced Pilot Training Computer Cost Model (APT), by H. E. Boren, Jr.

This Memorandum, Volume II of the series, describes the computer program for a pilot flow simulator called the PILOT Model. As explained in Volume I, the PILOT model is a representation of the flow of pilots through the training process--precommissioning, and undergraduate and advanced pilot training. The model also simulates the movement of pilots to and from their subsequent assignments, that is, the flow of pilots into and out of desk jobs, flying jobs, and the advanced training schools to which they are sent for the additional instruction (cross-training) required to qualify them to fly a different type and model of aircraft. It is suggested, therefore, that the user read Volume I for an understanding of the total process of training USAF pilots.

The PILOT model may be used to estimate the effects of alternative policies on these pilot flows and the effect of these flows, in turn, upon training rates. The PILOT model may also be used in combination with (used to provide inputs to) the models representing precommissioning training and undergraduate and advanced pilot training activities. This coupling of the individual pilot training models provides a simulation of the entire Air Force training process that may be used to estimate the overall impact upon costs of pilot training alternatives.

SUMMARY

This Memorandum is a manual or guide for users of the PILOT model. Section I is an introductory explanation of the purposes of the model. Sections II and III describe the data inputs and program outputs. They provide a listing of a sample input deck and a sample printout of each of the six sets of output data. Section IV is a detailed explanation, illustrated by flowcharts, of the routines involved in entering the data inputs, computing requirements for new pilots and for cross-training of pilots, searching for means by which to fill the requirements, and computing commission training entrants and graduates.

The PILOT model program was written in FORTRAN IV. It uses 116K bytes of core on a 360/65 computer. As indicated above, all input data is read from cards and the output is printed.

The final section of the Memorandum presents a symbolic listing of the FORTRAN IV computer program.

CONTENTS

Preface iii

Summary v

List of Figures ix

Section
I. Introduction 1

II. Program Input Deck 2

III. Program Output 9

IV. Program Description 16

Appendix: FORTRAN IV (360/65) Listing of Pilot Model Computer Program 39

FIGURES

1. Sample Input Deck 3
2. Sample Program Output--Main Information 10
3. Sample Program Output--Pilots Entering CCTS 11
4. Sample Program Output--Inventory of Desk Job Pilots at Year's End 12
5. Sample Program Output--Commission Training 14
6. Sample Program Output--Entrants into UPT from Six Sources 15
7. Flowchart of the Computation of A2 for Year 1 20
8. Flowchart of the Computation of Pilot Requirements 21
9. Flowchart of the Process of Filling Pilot Requirements with Upgraded Pilots 22
10. Flowchart of the Computation of the Desired Graduates from Each of Two Sources, New People and Cross-Training .. 23
11. Flowchart of the Computation of the Beginning and End Years of UPT, Survival School, and CCTS 25
12. Flowchart of the Process of Filling Requirements for New People and Cross-Training 27
13. Flowchart of the Process of Checking UPT Capacity 28
14. Flowchart of the Process of Cross-Training Pilots in Similar Aircraft 32
15. Flowchart of the Process of Cross-Training Pilots in Dissimilar Aircraft 33
16. Flowchart of the Process of Cross-Training Pilots from Desk Jobs 34
17. Flowchart of the Process of Updating the Desk Job Inventory 35
18. Flowchart of the Process of Scheduling Pilots through Commission Training 37

I. INTRODUCTION

The purpose of the PILOT model is to simulate the flow of pilots through formal training and into the jobs in which they are required.

Air Force formal training for the production of pilots consists of:

1. Air Force Academy (AFA), Reserve Officer Training Corps (ROTC) and Officer Training School (OTS) programs. The Precommissioning Training programs are treated as a part of the pilot training process because only commissioned officers are admitted to pilot training. (The PILOT model computer program refers to the Precommissioning Training programs as "commission training.")

2. Undergraduate Pilot Training (UPT). After receiving his commission, the pilot candidate is given flying training at one of ten UPT bases. It is through successful completion of this program that he earns his pilot's wings.

3. Survival School (SS). This school provides instruction in basic techniques of survival in physically- or politically-hostile environments. This training is mandatory for all flight crews.

4. Advanced Pilot Training (APT). This training qualifies the pilot to fly a specific type and model of operational aircraft. It is conducted by organizations referred to, variously, as Combat Crew Training Schools (CCTS), Replacement Training Units (RTU) or Transport Training Units (TTU), or by the general designation of Advanced Pilot Training. (In the PILOT model computer program, all advanced pilot training is referred to simply as CCTS.)

Given the number of trained pilots required over a specified time period and a statement of the policy concerning flow of pilots between desk and flying assignments,* the computer program determines at what times and in what numbers pilots must enter and leave the various training courses in order to meet the requirement.

The program can process requirements for a maximum of 20 years, 80 aircraft systems and 3 categories of pilots.

---

*Pilots are assumed to be required in both flying and nonflying jobs.

II. PROGRAM INPUT DECK

In this section, the format for each card type in the input deck is illustrated and the names of the data inputs are defined.

The input deck setup is as follows:

1. Run title card.
2. One type 1 card.
3. One type 2 card.
4. One type 4 card for each weapon system.
5. One type 6 card followed by a set of type 5 cards, for each year starting with the base year. (Within each type 5 set, there is a card for each weapon system and pilot type for which information exists.)
6. One type 7 card for each year, beginning with the base year.
7. One type 8 card for each year, beginning with the year following the base year.

A sample input deck is illustrated in Fig. 1.

Run title card. The run title can appear anywhere on this card. The card is read in a 20A4 format. The first card in the input deck listed in Fig. 1 is a run title card.

Type 1 card. The type 1 card is the run control card. It contains the following data:

Data Name	Position on Card	Format
"1"	Col. 1	I1
NBYR	Cols. 5-6	I2
NLYR	Col. 11-12	I2
NWPN	Cols. 17-18	I2

NBYR is the base year,* NLYR is the last year* used in the run, and NWPN is the number of the last weapon system used in the run.

The program can handle a maximum of 20 years, and 80 weapon systems. Hence,

$$NLYR - NBYR \leq 19 \quad \text{and} \quad NWPN \leq 80.$$

The 19 years cannot straddle the century.

*The last two digits of the year are entered; for example, if the base year is 1968, NBYR should be 68.

```
VARIATION NO. 8 ON BASE CASE -- 8 % PILOT LOSS RATE, 8 % ROTATION INTO DESKS
1   41     52      1
2       20      7     20     20  1460   730     90   365     6000            7000 1  365
4  1         1         2         3         1                                          9
6 .08                                  3900     1                  18         372    41
5 41         1         1     30000.                          .08          .08       100.  100.    9
6 .08                            2460          3900     1                  18         372    42
5 42         1         1     31000.      .42414      .08          .08       100.  100.    9
6 .08                            2460          3900     1                  18         372    43
5 43         1         1     32000.      .41557      .08          .08       100.  100.    9
6 .08                                  3900     1                  18         372    44
5 44         1         1     32000.      .48666      .08          .08       100.  100.    9
6 .08                                  3900     1                  18         372    45
5 45         1         1     32000.      .48920      .08          .12863    100.  100.    9
6 .08                                  3900     1                  18         372    46
5 46         1         1     30000.      .45254      .08          .13807    100.  100.    9
6 .08                                  3900     1                  18         372    47
5 47         1         1     28000.      .47160      .08          .14875    100.  100.    9
6 .08                                  3900     1                  18         372    48
5 48         1         1     26000.      .49150      .08          .08405    100.  100.    9
6 .08                                  3900     1                  18         372    49
5 49         1         1     26000.      .51235      .08          .08474    100.  100.    9
6 .08                                  3900     1                  18         372    50
5 50         1         1     26000.      .51437      .08          .08       100.  100.    9
6 .08                                  3900     1                  18         372    51
5 51         1         1     27000.      .42998      .08          .08       100.  100.    9
6 .08                                  3900     1                  18         372    52
5 52         1         1     28000.      .41963      .08          .08       100.  100.    9
7   41   500        1700          80          300                    .3    .1    .12
7   42   500        1700          80          300                    .3    .1    .12
7   43   500        1700          80          300                    .3    .1    .12
7   44   500        1700          80          300                    .3    .1    .12
7   45   500        1700          80          300                    .3    .1    .12
7   46   500        1700          80          300                    .3    .1    .12
7   47   500        1700          80          300                    .3    .1    .12
7   48   500        1700          80          300                    .3    .1    .12
7   49   500        1700          80          300                    .3    .1    .12
7   50   500        1700          80          300                    .3    .1    .12
7   51   500        1700          80          300                    .3    .1    .12
7   52   500        1700          80          300                    .3    .1    .12    9
8   42.144  .2    .327  .038  .299  .22
8   43.144  .2    .327  .038  .299  .22
8   44.144  .2    .327  .038  .299  .22
8   45.144  .2    .327  .038  .299  .22
8   46.144  .2    .327  .038  .299  .22
8   47.144  .2    .327  .038  .299  .22
8   48.144  .2    .327  .038  .299  .22
8   49.144  .2    .327  .038  .299  .22
8   50.144  .2    .327  .038  .299  .22
8   51.144  .2    .327  .038  .299  .22
8   52.144  .2    .327  .038  .299  .22                                              9
```

Fig. 1 - Sample Input Deck

Type 2 card. The contents of the type 2 card are described below.

Data Name	Position on Card	Format
"2"	Col. 1	I1
T1	Cols. 6-9	F4.0
T2	Cols. 12-15	F4.0
T3	Cols. 18-21	F4.0
T4	Cols. 24-27	F4.0
S41	Cols. 30-33	F4.0
S42	Cols. 36-39	F4.0
S43	Cols. 42-45	F4.0
A64	Cols. 48-51	F4.0
A3	Cols. 54-59	F6.0
A65	Cols. 68-73	F6.0
NA66	Col. 75	I1
A67	Cols. 77-80	F4.0

T1 is the travel and leave time in days after CCTS.

T2 is the travel and leave time in days after survival school.

T3 is the travel and leave time in days after UPT.

T4 is the travel and leave time in days after commission training.

S41 is the AF Academy length in days (≤ 1460 days).

S42 is ROTC length in days (≤ 1460 days).

S43 is OTS length in days (≤ 1460 days).

A64 is the time in days required to expand UPT.

A3 is the number of desk job pilots in the base year.

A65 is the capacity of OTS.

NA66 is 1 if OTS expansion is allowed or

0 is OTS expansion is not allowed.

A67 is the time in days required to expand OTS.

Type 4 card. Each type 4 card pertains to a specific weapon system and contains the following data.

Data Name	Position on Card	Format
"4"	Col. 1	I1
NWP	Cols. 2-4	I3
NA7	Cols. 9-12	I4
NA10	Cols. 17-20	I4
NA11	Cols. 25-28	I4
NAIZ	Cols. 33 36	I4
IC	Cols. 80	I1

NWP is the weapon system number.

NA7 is the aircraft type of the weapon system: The type can be either bomber/cargo (NA7 = 1) or fighter (NA7 = 0).

For cross-training pilots in this weapon system:

NA10 is the preference index* for pilots from similar aircraft.

NA11 is the preference index* for pilots from dissimilar aircraft.

NA12 is the preference index* for pilots in desk jobs.

IC = 9 if card is the last type 4 card; otherwise, Col. 80 is blank.

Type 6 card. The type 6 card contains the following data:

Data Name	Position on Card	Format
"6"	Col. 1	I1
A4	Cols. 2-5	F4.3
A6	Cols. 11-15	F5.4
A9	Cols. 21-26	F6.0
A62	Cols. 31-36	F6.0
NA63	Col. 41	I1
A20	Cols. 46-51	F6.0
S2	Cols. 56-60	F5.0
S3	Cols. 66-70	F5.0
NYR	Cols. 79-80	I2

A4 is the pilot loss rate for pilots in desk jobs in year NYR, where the pilot loss rate describes all losses from the pilot inventory, including retirement, resignation, death, promotion, disability, etc.

A6 is the attrition rate for CCTS in year NYR.

A9 is the number of pilots in the UPT pipeline in year NYR.

A62 is the UPT capacity in year NYR.

NA63 = 1 if UPT expansion is allowed in year NYR;
= 0 if UPT expansion is not allowed in year NYR.

A20 is the number of pilots leaving UPT in year NYR who have received pilot training but are not members of the Air Force.

S2 is survival school length in days in year NYR.

---

*The index can be 1, 2, or 3 if the source is the first, second, or third choice, respectively. Each of the three sources must have a unique preference assigned to it; i.e., no two sources can have the same preference index.

S3 is UPT course length in days in year NYR. (The sum of S3 is in the year after the base year and T4, the travel and leave time after commission training, must be less than, or equal to, 547.5 days: (S3(1) + T4 $\leq$ 547.5).

Type 5 card. The type 5 card contains the following information:

Data Name	Position on Card	Format
"5"	Col. 1	I1
NYR	Cols. 2-4	I3
NWP	Cols. 9-12	I4
NTP	Cols. 17-20	I4
A1	Cols. 25-30	F6.0
A2	Cols. 35-40	F6.4
A5	Cols. 45-50	F6.4
A5A	Cols. 55-60	F6.4
S1*	Cols. 65-68	F4.0
S1**	Cols. 71-74	F4.0
IC	Col. 80	I1

NYR is the year. NWP is the weapon system. NTP is the pilot type. For year NYR, weapon system NWP, and pilot type NTP:

A1 is the required pilot inventory.

A2 is the fraction of A1 desired through UPT.

A5 is the pilot loss rate for pilots in cockpits.

A5A is the rate at which pilots leave aircraft system NWP to transfer into desk jobs.

S1 is the length in days of CCTS.

CCTS can be described as either a long or a short course. For any year and weapon system type 1 pilots will take the short course if they are being cross-trained from a similar aircraft system, and type 2 and 3 pilots will take the long course. All pilots that are cross-trained from desk jobs or dissimilar aircraft systems will take the long course.

---

*Short course. This data should appear only on a card on which ntp = 1.

**Long course. This data should appear only on a card on which NTP = 1.

IC = 9 on each type 5 card which is the last card in a type 5 set; otherwise, it is blank.

Type 7 card. The type 7 card contains data pertaining to rates of attrition during commission training and to numbers of UPT entrants.

Data Name	Position on Card	Format
"7"	Col. 1	I1
NYR	Cols. 5-6	I2
A16	Cols. 7-12	F6.0
A17	Cols. 17-22	F6.0
A18	Cols. 27-32	F6.0
A19	Cols. 37-42	F6.0
A27	Cols. 57-60	F4.3
A28	Cols. 63-66	F4.3
A29	Cols. 69-72	F4.3
IC	Col. 80	I1

For year NYR:

A16 is the number of AF Academy graduates entering UPT.

A17 is the number of ROTC graduates entering UPT.

A18 is the number of rated officers entering UPT.

A19 is the number of nonrated officers entering UPT.

A27 is the attrition rate in the AF Academy.

A28 is the attrition rate in ROTC.

A29 is the attrition rate in OTS.

IC = 9 in the last type 7 card.

Type 8 card. The type 8 card contains information regarding attrition in UPT.

Data Name	Position on Card	Format
"8"	Col. 1	I1
NYR	Cols. 5-6	I2
A21	Cols. 7-10	F4.3
A22	Cols. 13-16	F4.3
A23	Cols. 19-22	F4.3
A24	Cols. 25-28	F4.3
A25	Cols. 31-34	F4.3
A26	Cols. 37-40	F4.3
IC	Col. 80	I1

For year NYR:

A21 is the attrition rate in UPT of AF Academy graduates.

A22 is the attrition rate in UPT of ROTC graduates.

A23 is the attrition rate in UPT of OTS graduates.

A24 is the attrition rate in UPT of rated officers.

A25 is the attrition rate in UPT of nonrated officers.

A26 is the attrition rate in UPT of others.

IC = 9 on the last type 8 card.

III. PROGRAM OUTPUT

The program prints six sets of information. A description and illustration of each set follow.

The first page of output contains simply the run title, e.g., "Variation No. 8 on Base Case--8% pilot loss rate, 8% rotation into desks."

Under the title "Pilot Model Output - Main Information," the following information is printed for each year, weapon system, and pilot type (Fig. 2):

1. Required pilot inventory, which is an input value.
2. Number of pilots lost from the cockpit inventory at the end of the year.
3. Number of pilots leaving the weapon system for desk jobs at the end of the year.
4. Net pilot requirement.
5. Number of pilots desired through UPT.
6. Number of pilots obtained through UPT.
7. Number of pilots desired through cross-training.
8. Number of pilots obtained through cross-training.
9. Number of pilots upgraded.

Under the title "Pilot Output - Pilots Entering CCTS," for each weapon system the following information about CCTS is printed for all years (Fig. 3):

1. Number of pilots entering CCTS from UPT, from similar A/C, from dissimilar A/C, and from desk jobs.
2. Total entrants into CCTS.
3. Total graduates from CCTS.

Under the title "Inventory of Desk Job Pilots at Year's End," the inventory of pilots in desk jobs at the end of the year is printed for each year (Fig. 4).

PILOT MODEL OUTPUT - MAIN INFORMATION

YR	WEAPON SYS	PILOT TYPE	PILOT REQ	LOSS FROM USAF (YEAR'S END)	LOSS TO DESK JOBS (YEAR'S END)	NET REQ/ SURPLUSES	NO. DESI THRU UPT	NO. OBTAINED THRU UPT	NO. DESIRED THRU X TRAINING	NO. OBTAINED THRU X TRAINING	PILOTS UPGRADED
44	1	1	32000.	2560.00	2560.00	-120.00	2491.70	2491.70	2628.30	2628.30	0.0
44	1	2	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44	1	3	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YEAR'S TOTALS			32000.	2560.00	2560.00	5120.00	2491.70	2491.70	2628.30	2628.30	0.0

Fig. 2 - Sample Program Output--Main Information

PILOT MODEL OUTPUT - PILOTS ENTERING CCTS
WEAPON SYSTEM 1

YR	FROM UPT	FROM SIMILAR A/C	FROM DISSIMILAR A/C	FROM DESK JOBS	TOTAL ENTRANTS	TOTAL GRADUATES
41	0.0	0.0	0.0	0.0	0.0	
42	2460.00	0.0	0.0	3340.00	5800.00	5800.00
43	2476.80	0.0	0.0	3483.20	5960.00	5960.00
44	2491.70	0.0	0.0	2628.30	5120.00	5120.00
45	2504.70	0.0	0.0	2615.30	5120.00	5120.00
46	2116.15	0.0	0.0	2560.01	4676.16	4676.16
47	2142.05	0.0	0.0	2400.05	4542.10	4542.10
48	2165.06	0.0	0.0	2239.94	4405.00	4405.00
49	2185.33	0.0	0.0	2079.97	4265.30	4265.30
50	2203.17	0.0	0.0	2080.07	4283.24	4283.24
51	2218.70	0.0	0.0	2941.30	5160.00	5160.00
52	2232.43	0.0	0.0	3087.57	5320.00	5320.00

Fig. 3 - Sample Program Output--Pilots Entering CCTS

INVENTORY OF DESK JOB PILOTS AT YEAR'S END

42	4580.00
43	3210.39
44	2885.26
45	2599.14
46	3947.35
47	5373.62
48	6868.78
49	6424.60
50	6033.80
51	4689.79
52	3387.03

Fig. 4 - Sample Program Output--Inventory of Desk Job Pilots at Year's End

Under the title "Pilot Model Output - Commission Training," the following information about commission training is printed for each year (see Fig. 5):

1. Number of AF Academy entrants.
2. Number of AF Academy graduates.
3. Number of ROTC entrants.
4. Number of ROTC graduates.
5. Number of OTS entrants.
6. Number of OTS graduates.

Finally, under the title "Pilot Model Output - Entrants into UPT from Six Sources," the following information about UPT is printed for each year (see Fig. 6):

1. Number of entrants into UPT by source: AF Academy, ROTC and OTS graduates, rated officers on active duty, nonrated officers on active duty, and "Others."*
2. Total number of UPT entrants.
3. Total number of UPT graduates.
4. A "Yes" or "No" answer as to whether UPT was expanded.

---

*"Others" includes students from Air National Guard, Marines and MAP who are given UPT training but who do not add to the pilot strength of the Air Force. UPT entrants also include a few Military and Naval Academy graduates.

PILOT MODEL OUTPUT - COMMISSION TRAINING

YR	AF ACAD ENTRANTS	AF ACAD GRADUATES	ROTC ENTRANTS	ROTC GRADUATES	OTS ENTRANTS	OTS GRADUATES
37	714.29	0.0	0.0	0.0	0.0	0.0
38	714.29	0.0	0.0	0.0	0.0	0.0
39	714.29	0.0	1888.89	0.0	0.0	0.0
40	714.29	0.0	1888.89	0.0	0.0	0.0
41	714.29	500.00	1888.89	1700.00	649.64	571.68
42	714.29	500.00	1888.89	1700.00	676.00	596.64
43	714.29	500.00	1888.89	1700.00	703.16	618.78
44	714.29	500.00	1888.89	1700.00	725.12	638.10
45	714.29	500.00	1888.89	1700.00	69.04	60.76
46	714.29	500.00	1888.89	1700.00	112.78	99.25
47	714.29	500.00	1888.89	1700.00	151.62	133.43
48	0.0	500.00	1888.89	1700.00	185.85	163.55
49	0.0	500.00	1888.89	1700.00	215.98	190.06
50	0.0	500.00	0.0	1700.00	242.19	213.13
51	0.0	500.00	0.0	1700.00	265.38	233.54
52	0.0	0.0	0.0	0.0	0.0	0.0

Fig. 5 - Sample Program Output--Commission Training

PILOT MODEL OUTPUT - ENTRANTS INTO UPT FROM SIX SOURCES

YR	AF ACAD	ROTC	OTS	RATED OFF.	NON-RATED OFF.	OTHERS	TOTAL UPT ENTRANTS	TOTAL UPT GRADS	UPT EXPANDED
41	500.00	1700.00	571.68	80.00	300.00	0.0	3151.68	C.C	NO
42	500.00	1700.00	596.64	80.00	300.00	0.0	3176.64	2460.00	NO
43	500.00	1700.00	618.78	80.00	300.00	0.0	3198.78	2476.80	NO
44	500.00	1700.00	638.10	80.00	300.00	0.C	3218.10	2491.70	NO
45	500.00	1700.00	60.76	80.00	300.00	0.0	2640.76	2504.70	NO
46	500.00	1700.00	99.25	80.00	300.00	0.0	2679.25	2116.15	NO
47	500.00	1700.00	133.43	80.00	300.00	0.0	2713.43	2142.05	NO
48	500.00	1700.00	163.55	80.00	300.00	0.0	2743.55	2165.06	NO
49	500.00	1700.00	190.06	80.00	300.00	0.0	2770.06	2185.33	NO
50	500.00	1700.00	213.13	80.00	300.00	0.0	2793.13	2203.17	NO
51	500.00	1700.00	233.54	80.00	300.00	0.0	2813.54	2218.70	NO
52	0.0	0.0	0.0	0.0	0.0	0.0	0.C	2232.43	NO

Fig. 6 - Sample Program Output--Entrants into UPT from Six Sources

23

IV. PROGRAM DESCRIPTION

PROGRAM STRUCTURE

The program for the PILOT model is composed of a main routine (PILOT) and the following nine subroutines: READ2, READ4, READ5, READ7, READ8, CROSS, TTIME, OUTP, and OUTPUT.

The first five subroutines are used to read type 2, 4, 5, 7, and 8 cards, respectively. Subroutine CROSS determines the number of pilots to be taken from a given source for CCTS cross-training. Given the end year of UPT, subroutine TTIME computes the beginning year of UPT, the end year of commission training, and the beginning years of the AF Academy, ROTC and OTS training. Subroutine OUTPUT prints the information entitled "Pilot Model Output - Pilots Entering CCTS." Subroutine OUTP prints the information entitled "Pilot Model Output - Commission Training" and "Pilot Model Output - Entrants into UPT from Six Sources."

PROGRAM FLOW

The Pilot program can be divided into four logical sections of execution:

1. Data input and initialization of variables.
2. Computation of pilot requirements for a given year, all weapon systems and pilot types.
3. An attempt to fill requirements for new pilots and for cross-training for a given year, all weapon systems, and pilot types.
4. Computation of commission training entrants and graduates for all years.

Section 1 is executed initially. Then, for each year, Sections 2 and 3 are executed consecutively. Section 4 is executed last.

A detailed description of each of the above four sections follows. All variable names beginning with an "A," "T" or "S" are input quantities and were defined in Section II of the Memorandum. All of the input data that represent a length of time are initially converted from days to fractions of a year. The subscripts used in the program are

N, W, and T where W represents a weapon system and T represents a pilot type. N represents a year relative to the base year 0; hence, if the real base year is 1968, the year 1970 would be represented by N = 2.

Section 1: Data Input

The data input deck has been described in Section II of this Memorandum. As this data deck is read, the program will print error messages and then terminate execution if the following error conditions are encountered:

If the first card in the input deck does not contain a "1" in column 1, the following message is printed: "1" CARD IS MISSING FROM INPUT DECK. If the second card in the deck does not contain a "2" in column 1, this message is printed: "2" CARD IS MISSING FROM INPUT DECK.

After the type 2 card, the type 4 cards are read. If the program encounters a card that does not contain a "4" in column 1, this message is printed: CARD READ IS NOT A TYPE 4 CARD - CHECK FOR A MISPLACED CARD IN THE TYPE 4 SECTION. This error statement will also be printed if a "9" does not appear in column 80 of the last type 4 card. The "9" signals the end of the set of cards. If the "9" does not appear, the program will read the next card, a type 6 card, "thinking" that it should be a type 4 card.

If a weapon system number on a type 4 card exceeds the number 80, the following message is printed: WEAPON SYSTEM NUMBER ON TYPE 4 CARD EXCEEDS ALLOWABLE NUMBER.

After the type 4 cards are read, the program expects to read one type 6 card followed by a set of type 5 cards for each consecutive year starting with the base year. If a card without a "6" in column 1 is encountered when the program expects to read a type 6 card, the following message is printed: A TYPE 6 CARD IS MISSING. If a type 6 card does not contain the right consecutive year, this message is printed: TYPE 6 CARD DOES NOT CONTAIN THE RIGHT YEAR.

Having read a type 6 card for a particular year, the program reads type 5 cards for that year until a "9" is encountered in column 80 of a

card. The "9" signals the last type 5 card in this set. If a card does not contain a "5" in column 1, this message is printed: CARD READ IS NOT A TYPE 5 CARD - CHECK FOR A MISPLACED CARD IN A TYPE 5 SECTION.

If a type 5 card does not contain the same year as the preceding type 6 card, the following message is printed: A TYPE 5 CARD DOES NOT CONTAIN THE RIGHT YEAR. If the weapon system number is greater than 80 or a pilot type number is greater than 3 on a type 5 card, the respective messages are printed: WEAPON SYSTEM NO. ON TYPE 5 CARD EXCEEDS ALLOWABLE NUMBER; or, PILOT TYPE NO. ON A TYPE 5 CARD EXCEEDS ALLOWABLE NUMBER.

After a type 6 card and all type 5 cards for the final year have been read, the program reads a type 7 card for each consecutive year beginning with the base year. A "9" in column 80 signals the last type 7 card. Then, a type 8 card for each consecutive year is read beginning with the year after the base year. Again, a "9" in column 80 signals the last type 8 card. If the type number is not correct on either a type 7 or 8 card, the following message is printed:

CARD READ IS NOT A $\left\{\begin{matrix}7\\8\end{matrix}\right\}$ CARD - CHECK FOR A MISPLACED CARD IN THE TYPE $\left\{\begin{matrix}7\\8\end{matrix}\right\}$ SECTION.

If either type card does not contain the right consecutive year, this message is printed:

A TYPE $\left\{\begin{matrix}7\\8\end{matrix}\right\}$ CARD DOES NOT CONTAIN THE RIGHT YEAR.

Data Initialization. Except for the variable A2, data initialization is a straightforward setting to zero of all variables. $A2_{N,W,T}$ is the fraction of the pilot requirement for year N, weapon system W, and pilot type T that is desired through UPT. A value of A2 for the first year is computed by the program in order that all pilots in the UPT pipeline in the base year are put into the system. This computed A2 will then be used in the first year for the weapon systems and pilot types for which the required pilots would graduate from UPT in the base year. The input A2 is used for the remaining requirements in the first year.

The data used in computing A2 are $A1_{0,W,T}$, $A1_{1,W,T}$, $A5_{0,W,T}$, and $A9_0$ for all weapon systems W and pilot types T in year 1 for which the required pilots would graduate from UPT in the base year 0. An indicator INDC(NW,NT) is set to "2" for each such weapon system NW and pilot type NT. At this time, the indicator INDC(NW,NT) is set to "1" if the required pilots in year 1 are found to have graduated from UPT before the base year.

The flow chart in Fig. 7 illustrates the computation of A2.

Section 2: Computation of Pilot Requirements

The procedure for computing pilot requirements is described for one year N, all weapon systems and pilot types. The procedure is as follows:

(1) For one weapon system, all pilot types, find the difference P1 between this year's required pilot inventory and the pilot inventory LP at the end of last year (see Fig. 8).

(2) Try to fill the pilot requirement for a type 1 pilot ($P1_{N,W,1}$) with upgraded type 2 and type 3 pilots from the inventory (LP_2 and LP_3) of year N-1. If upgraded type 2 and type 3 pilots are used from year N-1, an equal number of pilots are added to the pilot requirement for type 2 and type 3 pilots in year N. Having done this, try in the same manner to fill the pilot requirement for a type 2 pilot $P1_{N,W,2}$ with upgraded type 3 pilots from year N-1. UP2 and UP3 collect the upgraded type 2 and type 3 pilots, respectively.(see Fig. 9).

(3) After the pilot requirements $P1_{N,W,T}$ have been computed and adjusted for one weapon system, all pilot types, the program determines the number of desired CCTS graduates $P2_{N,W,T}$ and $P3_{N,W,T}$ from each of two sources, new people and cross-training, respectively, to fill the pilot requirements (see Fig. 10). If the year N is the first year and the required pilots $P1_{N,W,T,}$ would have graduated from UPT before the base year (INDC(NW,NT) = 1), $P2_{N,W,T}$ and $P3_{N,W,T}$ are set to 0. These pilots are already in the system.

(4) If $P1_{N,W,T}$ is negative, a surplus of pilots exists and will be assigned either to a bomber/cargo surplus pool $P4_N$ or to a fighter surplus pool $P5_N$, depending on the aircraft type of weapon system W.

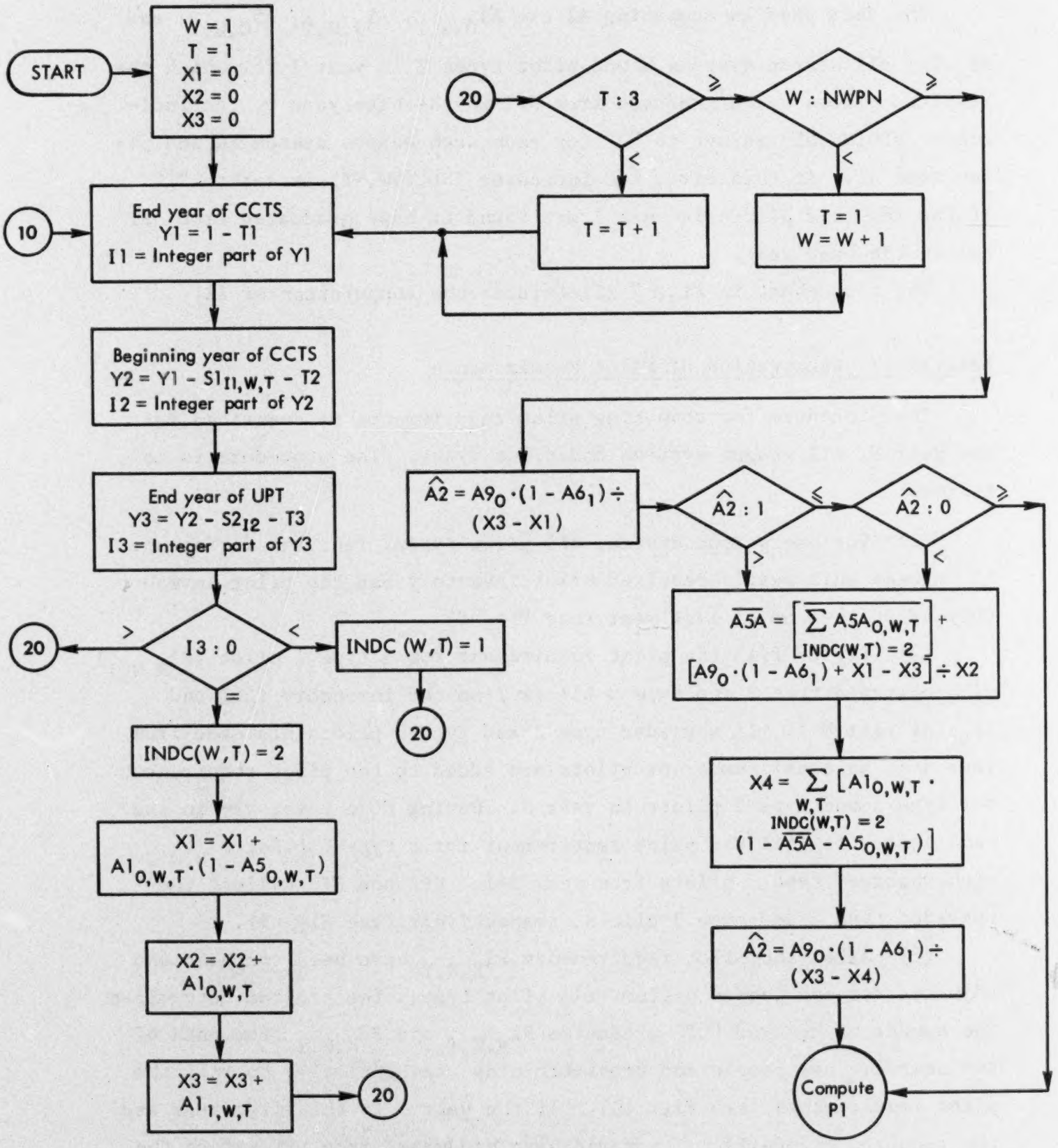

START
W = 1
T = 1
X1 = 0
X2 = 0
X3 = 0
10
End year of CCTS
Y1 = 1 - T1
I1 = Integer part of Y1
Beginning year of CCTS
Y2 = Y1 - S1I1,W,T - T2
I2 = Integer part of Y2
End year of UPT
Y3 = Y2 - S2I2 - T3
I3 = Integer part of Y3
I3 : 0
>
<
=
20
INDC (W,T) = 1
20
INDC(W,T) = 2
X1 = X1 + A1O,W,T · (1 - A5O,W,T)
X2 = X2 + A1O,W,T
X3 = X3 + A1I,W,T
20
20
T : 3
≥
<
W : NWPN
≥
<
T = T + 1
T = 1
W = W + 1
Â2 = A9O · (1 - A6I) ÷ (X3 - X1)
Â2 : 1
≤
>
Â2 : 0
≥
<
Ā5Ā = [Σ A5AO,W,T / INDC(W,T) = 2] + [A9O · (1 - A6I) + X1 - X3] ÷ X2
X4 = Σ [A1O,W,T · (1 - Ā5Ā - A5O,W,T)] W,T INDC(W,T) = 2
Â2 = A9O · (1 - A6I) ÷ (X3 - X4)
Compute P1

Fig.7—Flowchart of the computation of A2 for year 1

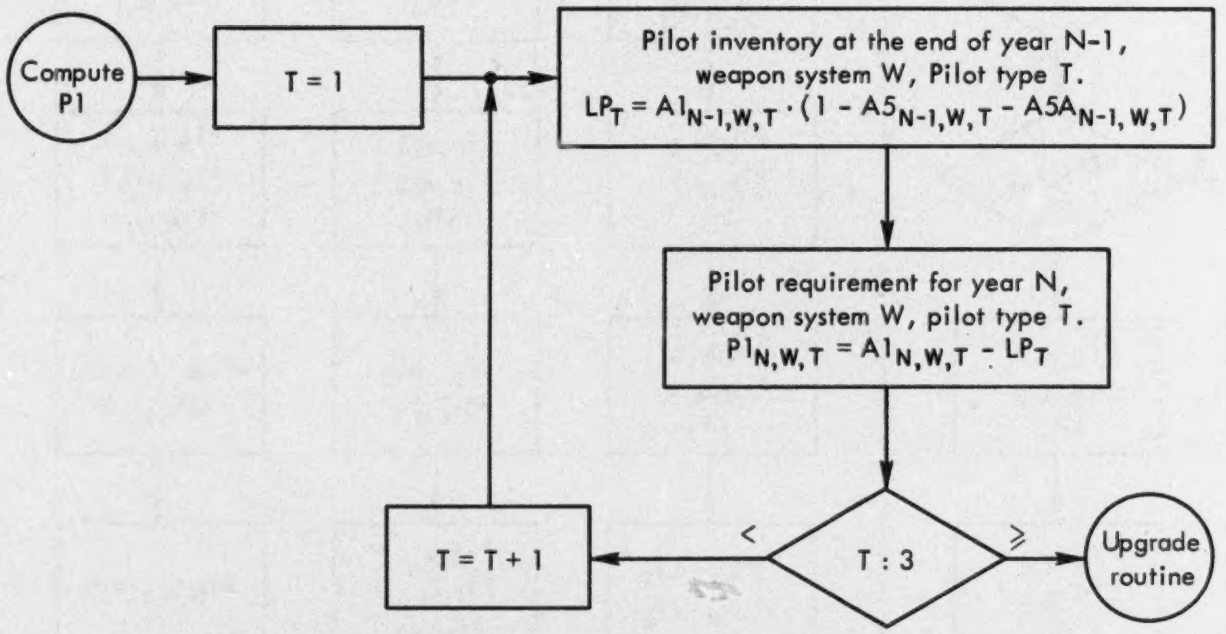

Compute P1
T = 1
Pilot inventory at the end of year N-1, weapon system W, Pilot type T.
$LP_T = A1_{N-1,W,T} \cdot (1 - A5_{N-1,W,T} - A5A_{N-1,W,T})$
Pilot requirement for year N, weapon system W, pilot type T.
$P1_{N,W,T} = A1_{N,W,T} - LP_T$
T : 3
<
≥
T = T + 1
Upgrade routine

Fig.8—Flowchart of the computation of pilot requirements

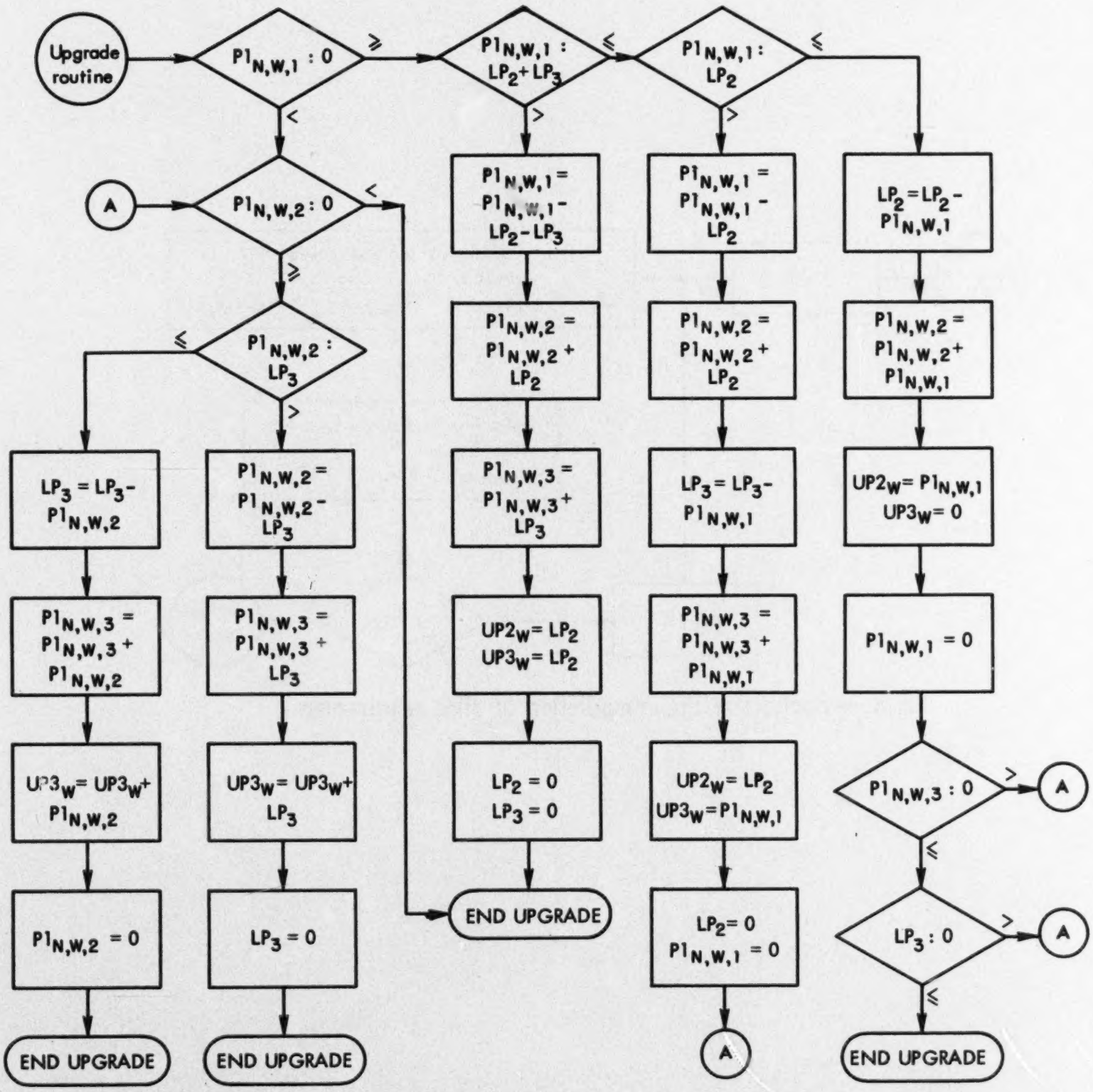


Fig. 9—Flowchart of the process of filling pilot requirements with upgraded pilots

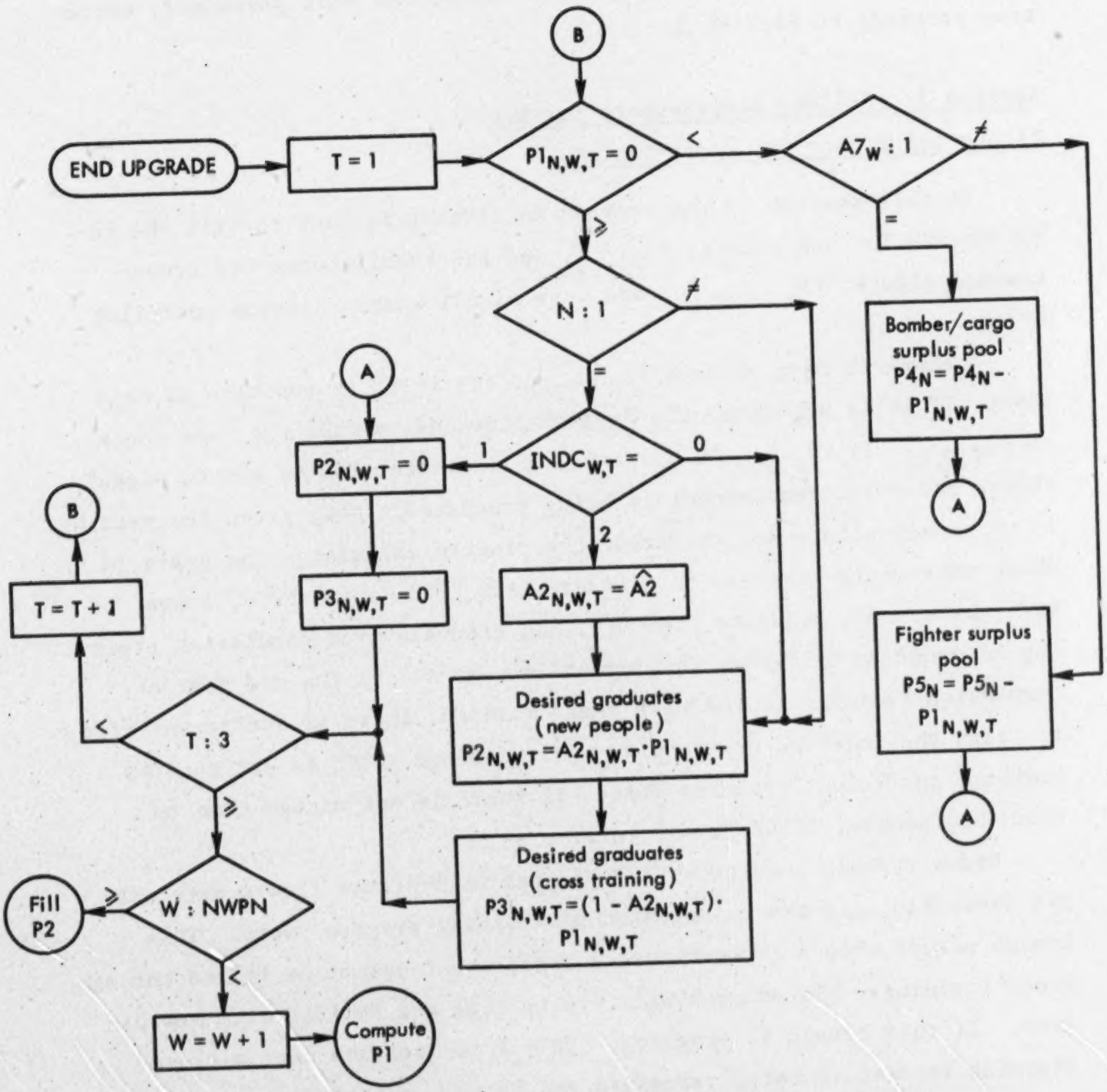


Fig. 10—Flowchart of the computation of the desired graduates from each of two sources, new people and cross-training

When these calculations are completed for the three pilot types, the program returns to "1" and executes "1", "2", and "3" for the next weapon system. After the last weapon system has been processed, execution proceeds to Section 3.

Section 3: Filling Requirements for New Pilots and Pilots for Cross-Training

In this section of the program an attempt is made to fill the requirements for new pilots, $P2_{N,W,T}$, and the requirements for cross-trained pilots, $P3_{N,W,T}$, for one year N, all weapon systems and pilot types.

A check is made on each $P2_{N,W,T}$ to see if it is positive or negative. If it is negative, the program proceeds to make the same check on $P3_{N,W,T}$. If $P2_{N,W,T}$ is positive, an indicator IND is set to signal that a new pilot requirement is being processed. Now, given the year N in which new pilots are required, the program calculates the years in which they would have had to graduate from CCTS, enter CCTS, leave survival school, graduate from UPT, and graduate from commission training in order to fill the requirement in year N. If the end year of commission training is the base year or later, there is sufficient time to train the required new people. An indicator IPIPE is set to 0 to indicate sufficient training time. If there is not enough time to train new people, IPIPE is set to 1.

Under certain conditions the program will branch from a part not yet described into the calculation of training program years. This branch occurs when a cross-training requirement cannot be filled through cross-training. The program will try to fill the deficit with new pilots. If this branch is executed, IND = 1 to indicate that a cross-training request is being processed and $P3_{N,W,T}$ contains the deficit.

The preceding discussion is illustrated in Fig. 11.

Suppose that there is sufficient time to train new pilots to fill either a new pilot requirement $P2_{N,W,T}$ for year N or the part of the cross-training requirement $P3_{N,W,T}$ for year N that cannot be filled from from cross-training sources.* If the attrition rate in CCTS (A6) is

*See p. 30 .

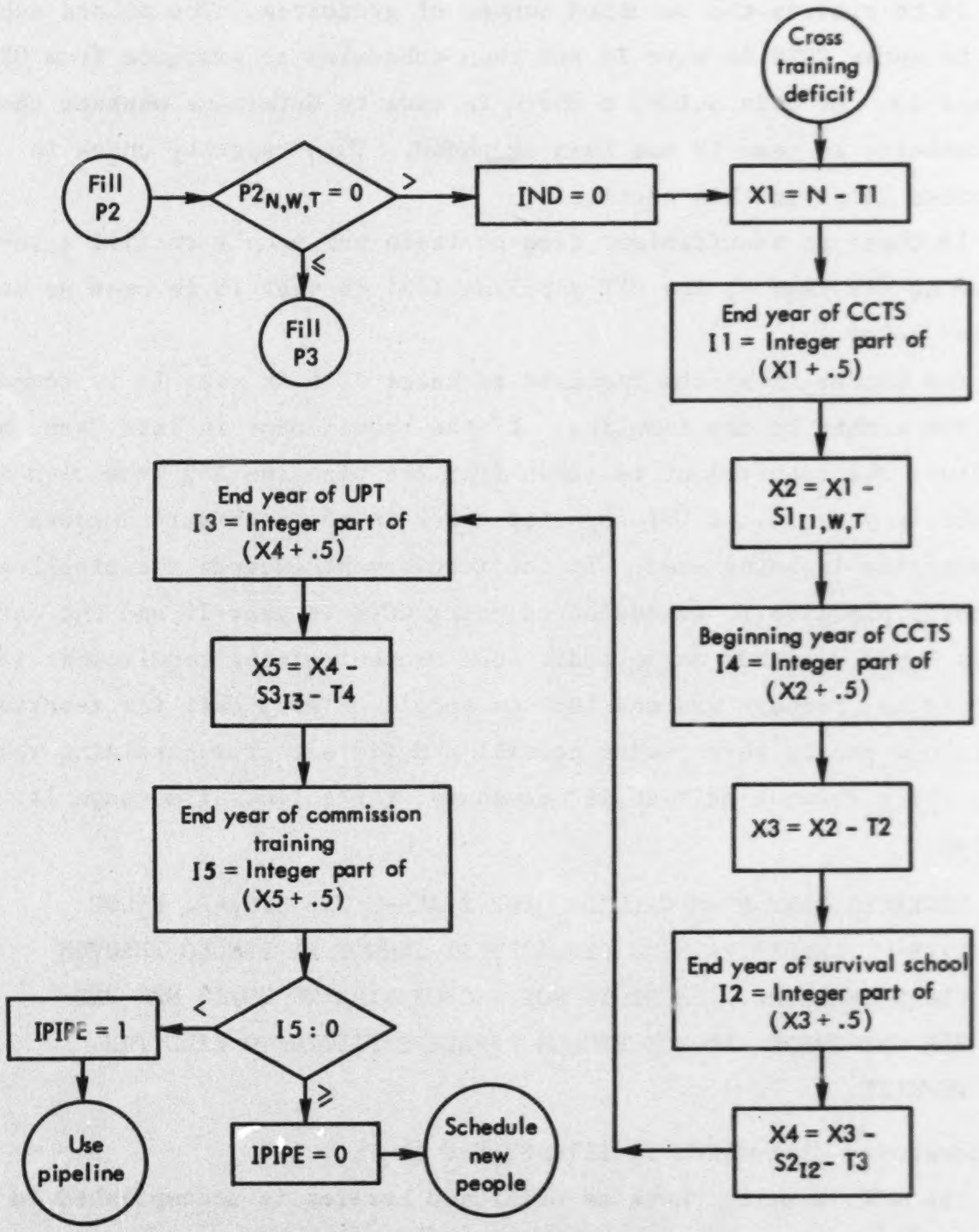

Cross training deficit
Fill P2
$P2_{N,W,T} = 0$
>
IND = 0
X1 = N - T1
≤
Fill P3
End year of CCTS
I1 = Integer part of (X1 + .5)
X2 = X1 - $S1_{I1,W,T}$
End year of UPT
I3 = Integer part of (X4 + .5)
Beginning year of CCTS
I4 = Integer part of (X2 + .5)
X5 = X4 - $S3_{I3}$ - T4
X3 = X2 - T2
End year of commission training
I5 = Integer part of (X5 + .5)
End year of survival school
I2 = Integer part of (X3 + .5)
<
I5 : 0
IPIPE = 1
≥
IPIPE = 0
Use pipeline
Schedule new people
X4 = X3 - $S2_{I2}$ - T3

Fig. 11—Flowchart of the computation of the beginning and end years of UPT, survival school, and CCTS

taken into consideration, enough pilots are scheduled to enter CCTS in year I4 to produce the required number of graduates. The pilots scheduled to enter CCTS in year I4 are then scheduled to graduate from UPT in year I3. At this point, a check is made to determine whether the UPT capacity in year I3 has been exceeded. This capacity check is described later in this section.

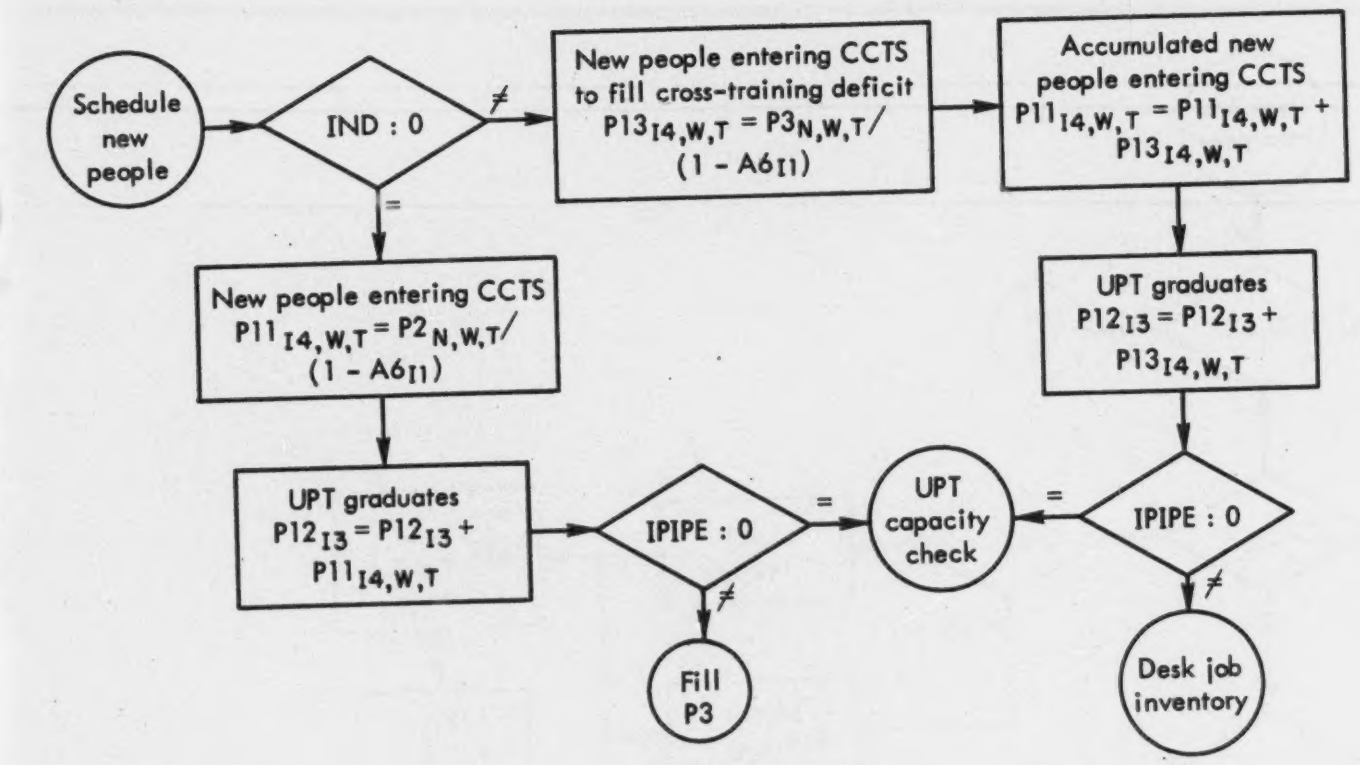
If there is insufficient time to train new people to fill a requirement for year N, the UPT pipeline (A9) in year I3 is used as described below.

The number of pilots required to enter CCTS in year I4 is compared with the number in the pipeline. If the requirement is less than the pipeline, the requirement is taken from the pipeline and scheduled into CCTS in year I4. A UPT capacity check is not necessary because the pipeline is being used. If the requirement exceeds the pipeline, the total pipeline is scheduled to enter CCTS in year I4 and the deficit is handled either as an additional cross-training requirement if the original request was one for new people or as a call for reserves if the new people were needed to fill a deficient cross-training requirement. If a reserve call-up is necessary, the following message is printed:

> RESERVES HAVE BEEN CALLED. FOR YEAR--, WP. SYS.--, PILOT TYPE--, CROSS-TRAINING REQUIREMENT CANNOT BE FILLED THROUGH CROSS-TRAINING. THERE IS NOT ENOUGH TIME TO TRAIN NEW PEOPLE AND THERE ARE NOT ENOUGH PIPELINE PILOTS TO FILL THE DEFICIT.

The foregoing discussion is illustrated in Fig. 12.

The UPT capacity check as mentioned earlier is accomplished in the following manner and illustrated in Fig. 13: The value of the indicator ICAP can be 0, 1, or 2. If ICAP for year I3 is 1, the capacity of UPT in year I3 has already been exceeded, but UPT expansion is allowed ($A63_{I3} = 1$) and there is enough time to expand. Hence, UPT in year I3 can handle those people assigned to it. If ICAP for year I3 is 0, the capacity in year I3 has not yet been exceeded. But the people added to the total UPT graduates in year I3, since the last UPT



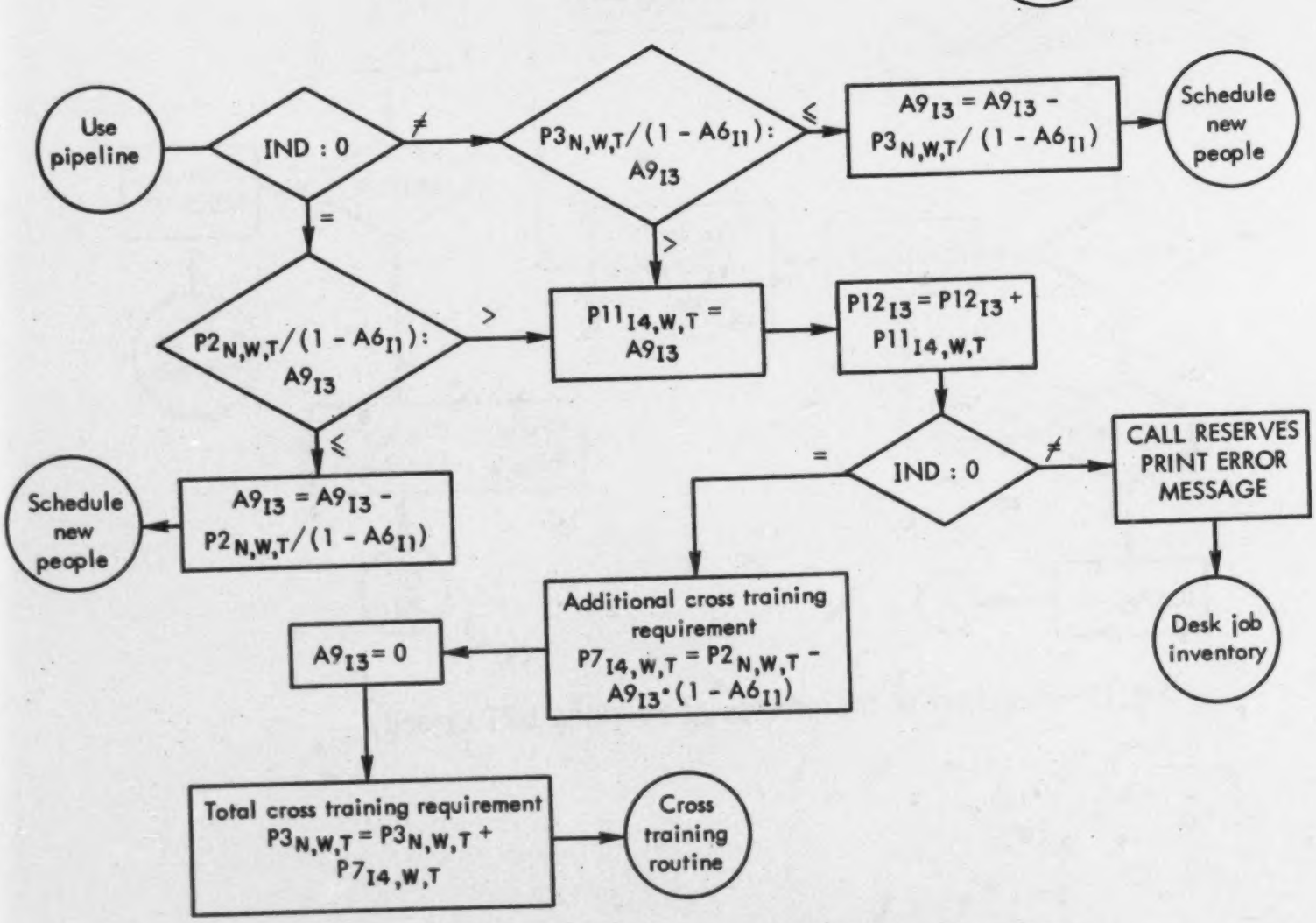


Fig. 12—Flowchart of the process of filling requirements for new people and cross-training

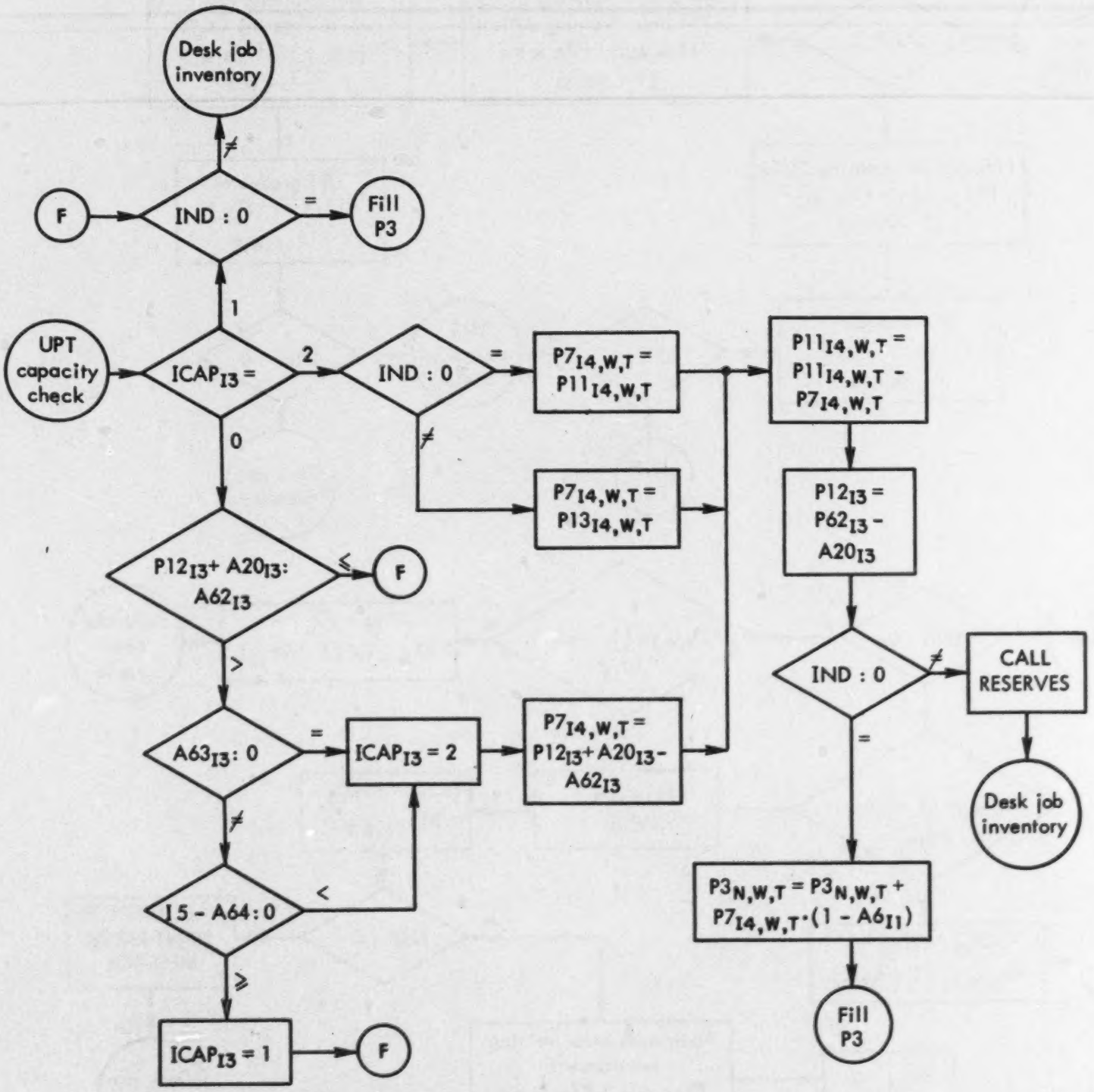


Fig. 13—Flowchart of the process of checking UPT capacity

capacity check, may have forced the total beyond capacity. The total, therefore, is compared to the capacity. If capacity has not been exceeded and expansion is allowed and there is enough time to expand, ICAP is set to 1 to indicate that UPT can handle all pilot candidates assigned to it in year I3. If the capacity is exceeded and expansion either is not allowed or cannot be accomplished in the time available, ICAP is set to 2 to indicate that no more trainees can be assigned to UPT in year I3. Those that cannot be handled by UPT are deleted from the number of CCTS entrants in year I4, and become either an additional cross-training requirement or a reserve call-up, depending on the value of IND. If a reserve call-up is necessary, the following message is printed:

> RESERVES HAVE BEEN CALLED. FOR YEAR--, WP. SYS.--, PILOT TYPE--, CROSS-TRAINING REQUIREMENT CANNOT BE FILLED THROUGH CROSS-TRAINING. THERE IS ENOUGH TIME TO TRAIN NEW PEOPLE, BUT UPT CAPACITY HAS BEEN EXCEEDED AND EITHER EXPANSION IS NOT ALLOWED, OR THERE IS NOT ENOUGH TIME TO EXPAND UPT.

Having processed a new pilot requirement for one weapon system and pilot type, the program attempts to fill the cross-training requirement $P3_{N,W,T}$ for that same weapon system and pilot type.

If $P3_{N,W,T}$ is less than zero, the program continues and updates the desk job inventory for year N.

There are three sources from which people can be taken for CCTS cross-training: similar aircraft, dissimilar aircraft, and desk jobs. Each source has been assigned a preference by weapon system. For the description that follows, assume that the similar aircraft source is first preferred ($A10_W = 1$), the dissimilar aircraft source is second preferred ($A11_W = 2$), and the desk job source is third preferred ($A12_W = 3$).

The program tries to fill P3 from the first preferred source, similar aircraft. It computes the year I4 in which people would enter CCTS. The number of people required to enter CCTS in year I4 in order to fill the requirement in year N is then compared either with the bomber/cargo surplus pool P4, if the weapon system aircraft type is

bomber/cargo ($A7_W = 1$), or with the fighter surplus pool P5, if the weapon system aircraft type is fighter ($A7_W = 0$). If the chosen pool is larger than the requirement, the required number of people are taken from the pool and scheduled to enter CCTS in year I4. Because this fills the cross-training requirement in year N for this weapon system and pilot type, the program then proceeds to update the desk inventory for year N.

If the chosen source (in this illustration, similar aircraft) is not large enough, the entire pool is scheduled to enter CCTS in year I4, and an attempt is made to fill the deficit from the second preferred source, dissimilar aircraft.

The procedure for using the dissimilar aircraft source is the same as that for the similar aircraft source except for the choice of pool to be used. If the weapon system aircraft type is bomber/cargo, the fighter surplus pool will be used; if the weapon system aircraft type is fighter, the bomber/cargo surplus pool will be used.

If the cross-training requirement cannot be completely filled by the second preferred source, the program tries the third source, that is, desk jobs. Again, the procedure for using the desk job source is the same as for the other two sources except that there is only one pool to be used, namely, the desk job inventory P6 from year N-1.

If the total requirement P3 cannot be filled from these three sources of APT-trained pilots, UPT is called upon to provide an input to APT to meet the shortage. If UPT cannot provide the full number needed or cannot provide them in sufficient time to eliminate the shortage, the reserves are called upon to fill whatever deficit remains. If a reserve call-up is necessary, the following message is printed:

> RESERVES HAVE BEEN CALLED. FOR YEAR--, WP. SYS.--, PILOT TYPE--, CROSS-TRAINING REQUIREMENT (WHICH INCLUDES PART OF THE NEW PEOPLE REQUIREMENT) CANNOT BE FILLED.

It should be noted that a type 1 pilot will take the short course in CCTS if cross-trained from similar aircraft and the long course if cross-trained from either of the remaining sources. A type 2 or type 3 pilot will take the long course in CCTS regardless of the source from which he is taken.

Figures 14, 15, and 16 illustrate the cross-training of pilots from the similar aircraft source, dissimilar aircraft source, and the desk job source, respectively.

After a new pilot requirement P2 and a cross-training requirement P3 for one weapon system W and pilot type T in year N have been processed, the desk job inventory P6 for year N is updated by the following:

1. Transfer into desk jobs from the pilot inventory in year N-1 for weapon system W and pilot type T.
2. Attrition from CCTS into desk jobs in year I1 for weapon system W and pilot type T.
3. Subtraction of the number of people taken from the desk job inventory in year N-1 to be cross-trained in CCTS for weapon system W and pilot type T.

After all P2 and P3 requirements for year N have been processed, the desk job inventory for that year reaches its final total by:

1. Addition of the pilots in the bomber/cargo and fighter surplus pools in the year N that have not been used.
2. Addition of the pilots in the desk job inventory at the beginning of year N-1.
3. Subtraction of pilot losses from desk jobs in year N-1.

If the final total is negative, an error message stating this fact is printed and program execution is terminated. If P6 for year N is positive, the program returns to Section 2 to calculate pilot requirements for year N+1, and continues through Section 3 to process new pilots and cross-training requirements for that year. After the final year has been processed, the program proceeds to Section 4.

The desk job inventory accumulation is illustrated in Fig. 17.

Section 4: Computation of Commission Training Entrants and Graduates

After the pilot requirements for all years, weapon systems and pilot types have been processed, the number of UPT graduates P12 in each year is known. Using the value of P12 in each year, the program

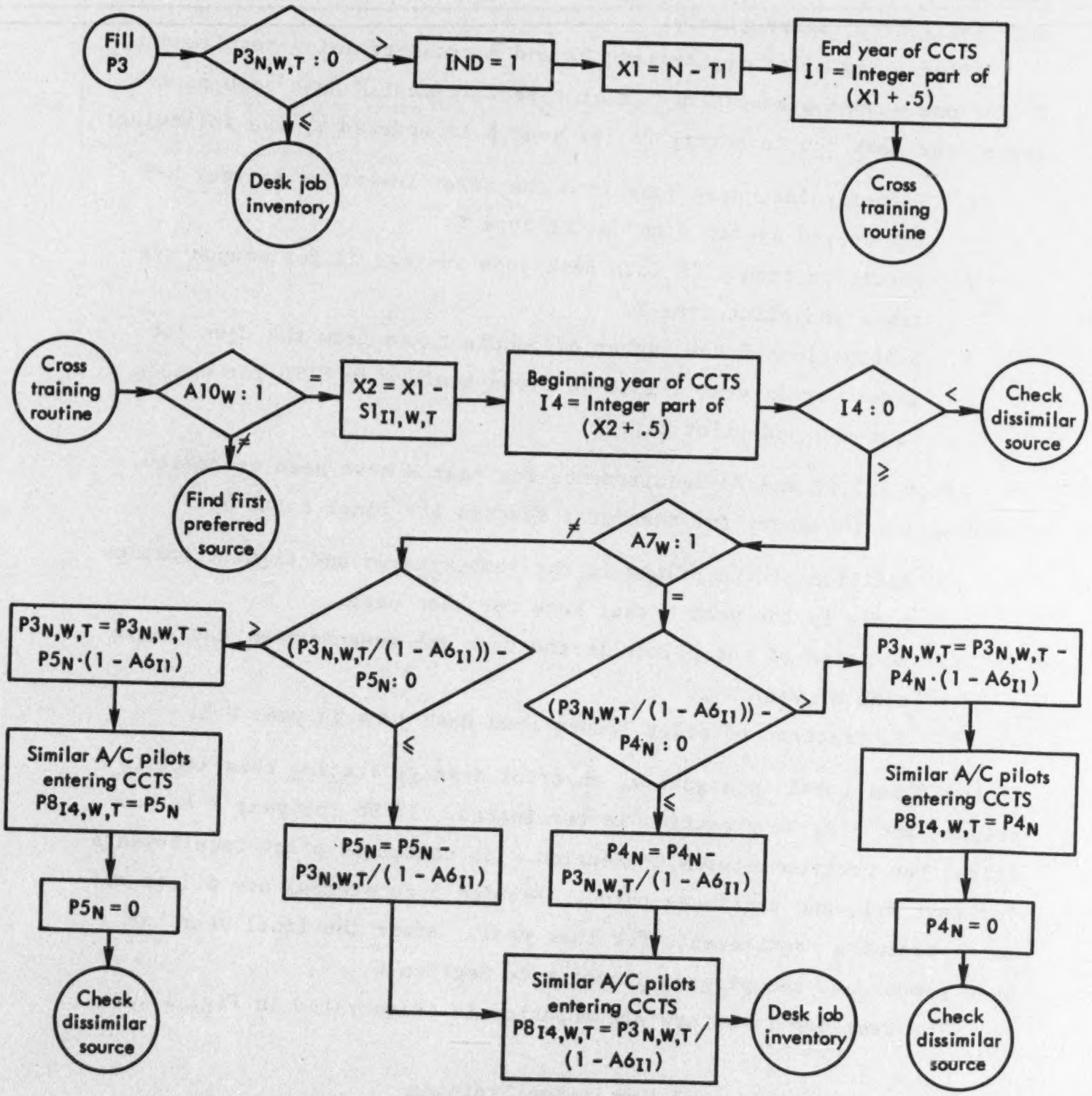


Fig. 14—Flowchart of the process of cross-training pilots in similar aircraft

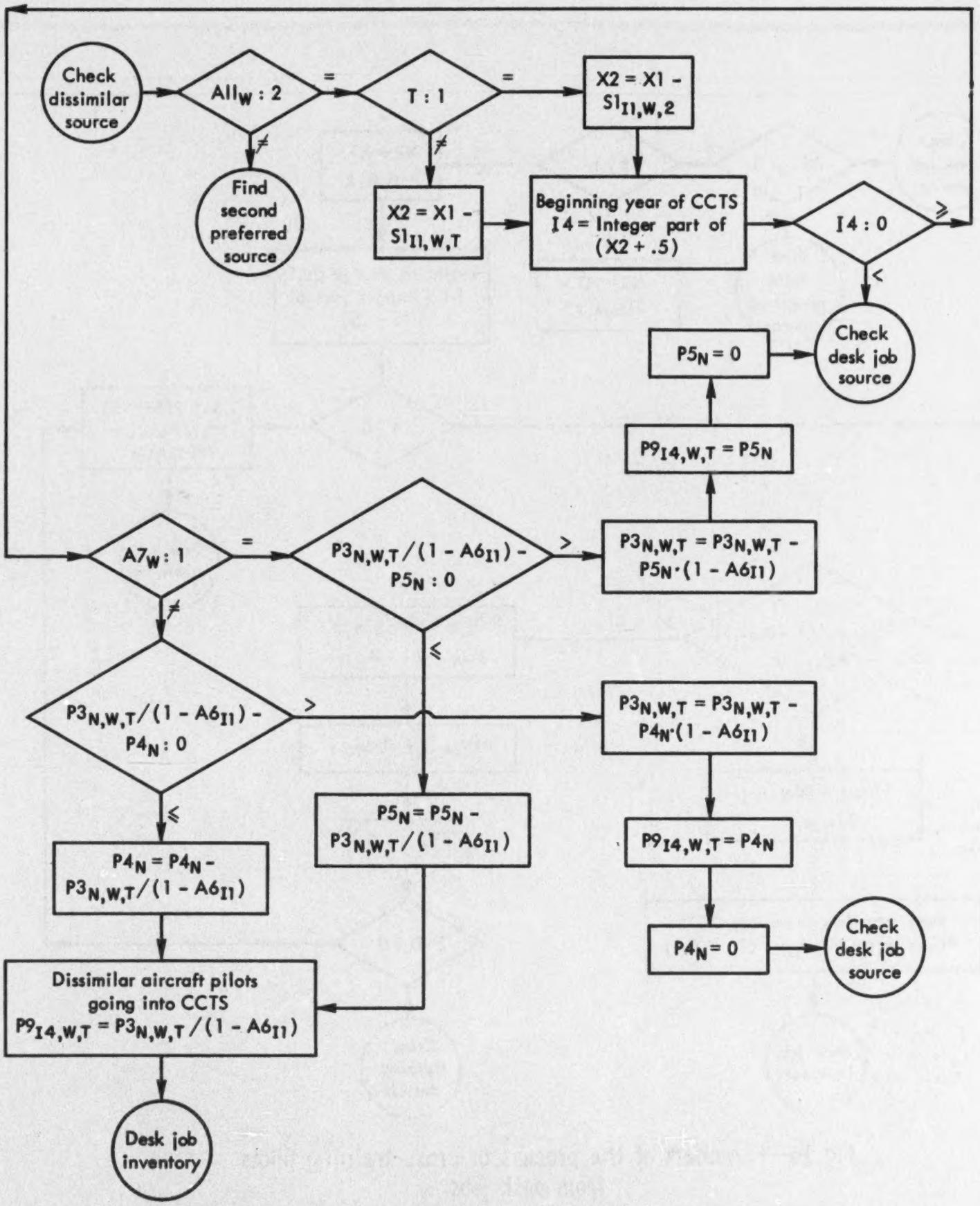


Fig. 15—Flowchart of the process of cross-training pilots in dissimilar aircraft

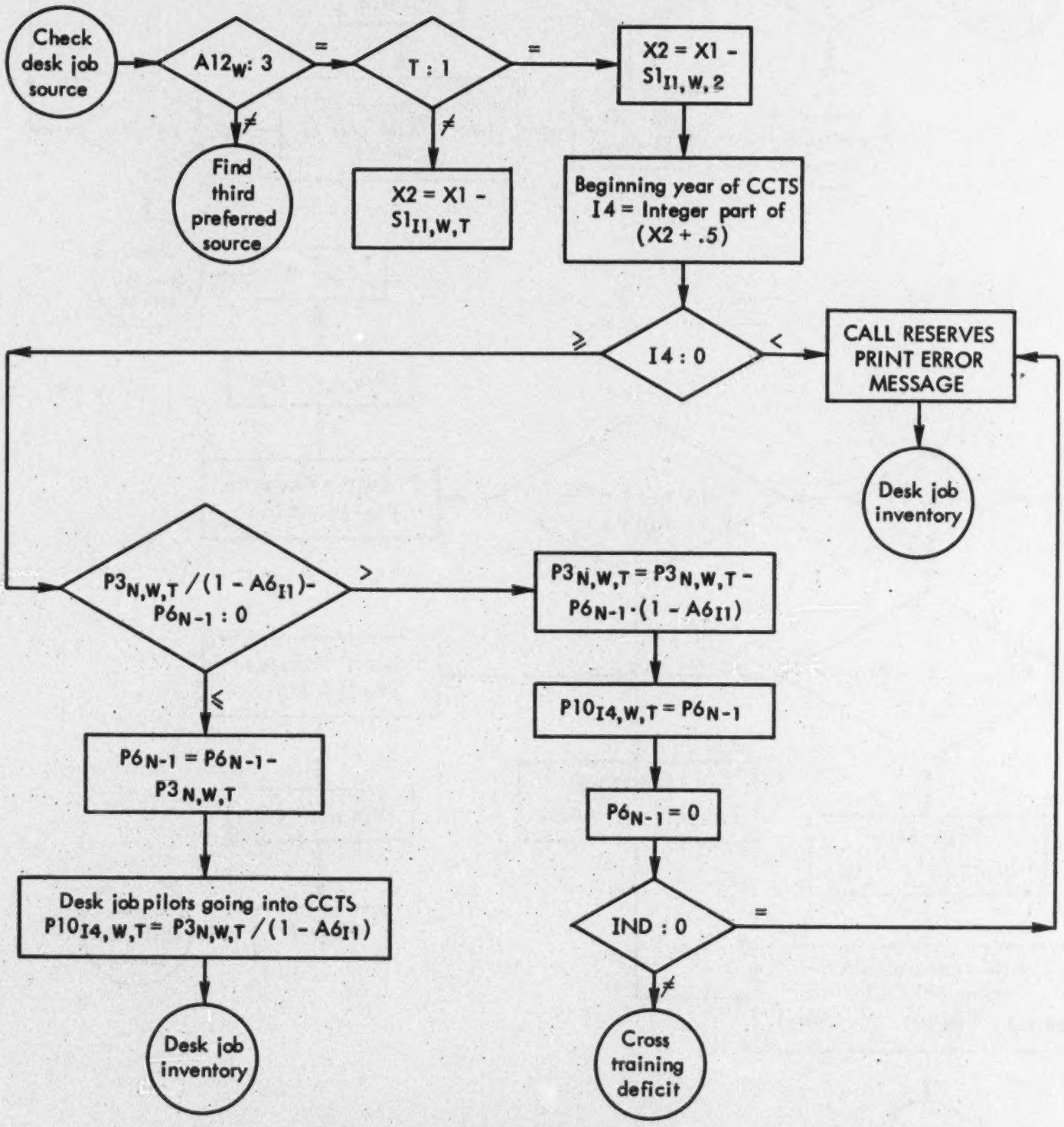


Fig. 16—Flowchart of the process of cross-training pilots from desk jobs

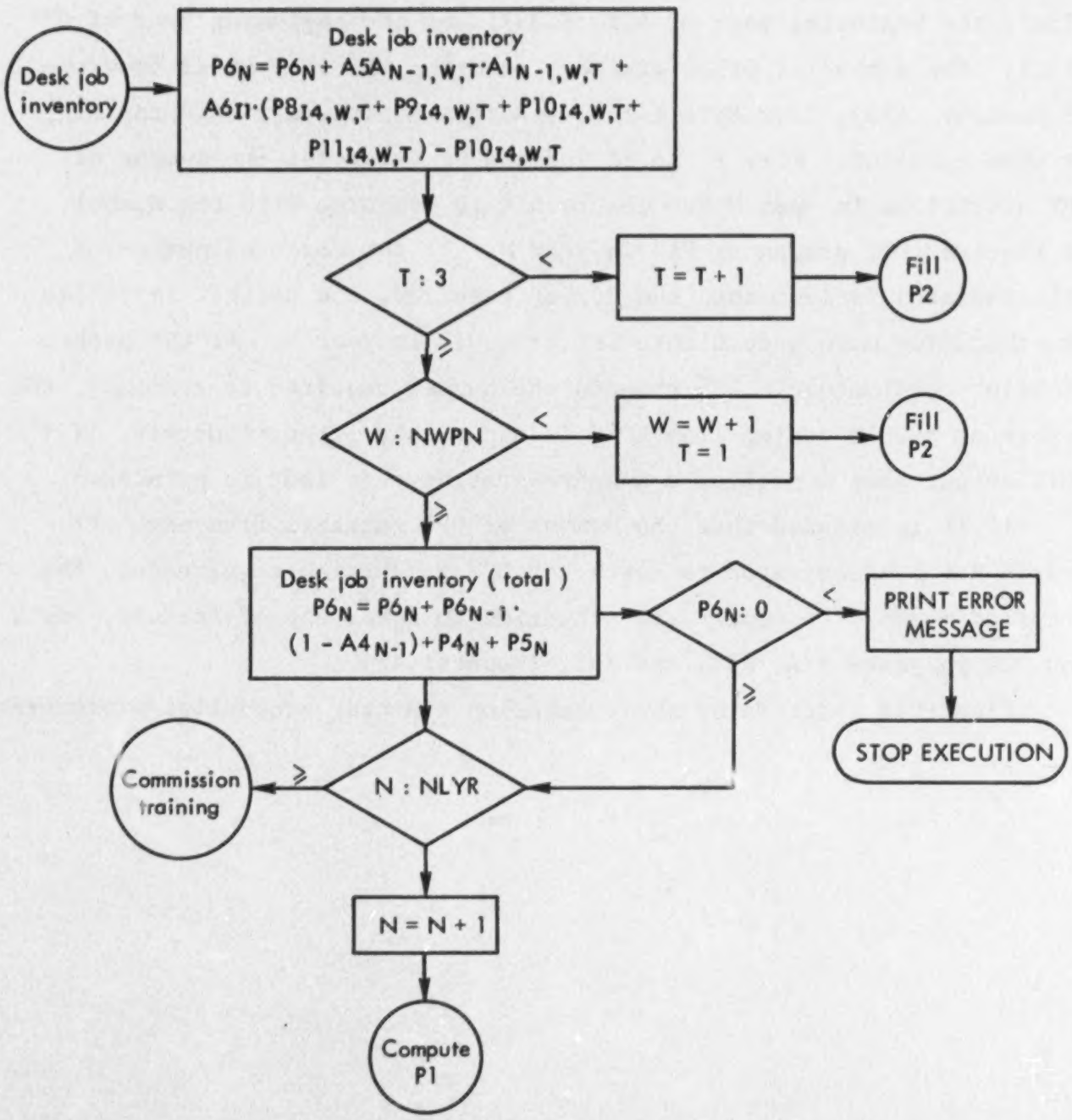


Fig. 17—Flowchart of the process of updating the desk job inventory

schedules people through commission training and into UPT in the following manner:

Given year N as the end year of UPT, successive computations are made (going back in time) of the beginning year of UPT (I1), the end year of commission training (I2), the beginning year of the AF Academy (I3A), the beginning year of ROTC (I3B), and the beginning year of OTS (I3C). The number of pilot trainees entering UPT in year I1 from the AF Academy (A16), from ROTC (A17), and from active duty (A18 and A19) is then totalled. This total is reduced by deducting the number of UPT attritions in year N and the result is compared with the number of required UPT graduates P12 in year N. If the computed number of UPT graduates is less than the number required, the deficit is filled by scheduling more people into UPT from OTS in year N. If the number of pilot candidates in UPT exceeds the number required to graduate, the number of people coming from ROTC is diminished proportionately. (If ROTC output goes negative, a message stating this fact is printed.)

If it is assumed that the number of UPT entrants from each UPT source has been adjusted to match the UPT graduation requirement, the required numbers of people are scheduled to enter the AF Academy, ROTC, and OTS in years I3A, I3B, and I3C, respectively.

Figure 18 illustrates the commission training scheduling procedure.

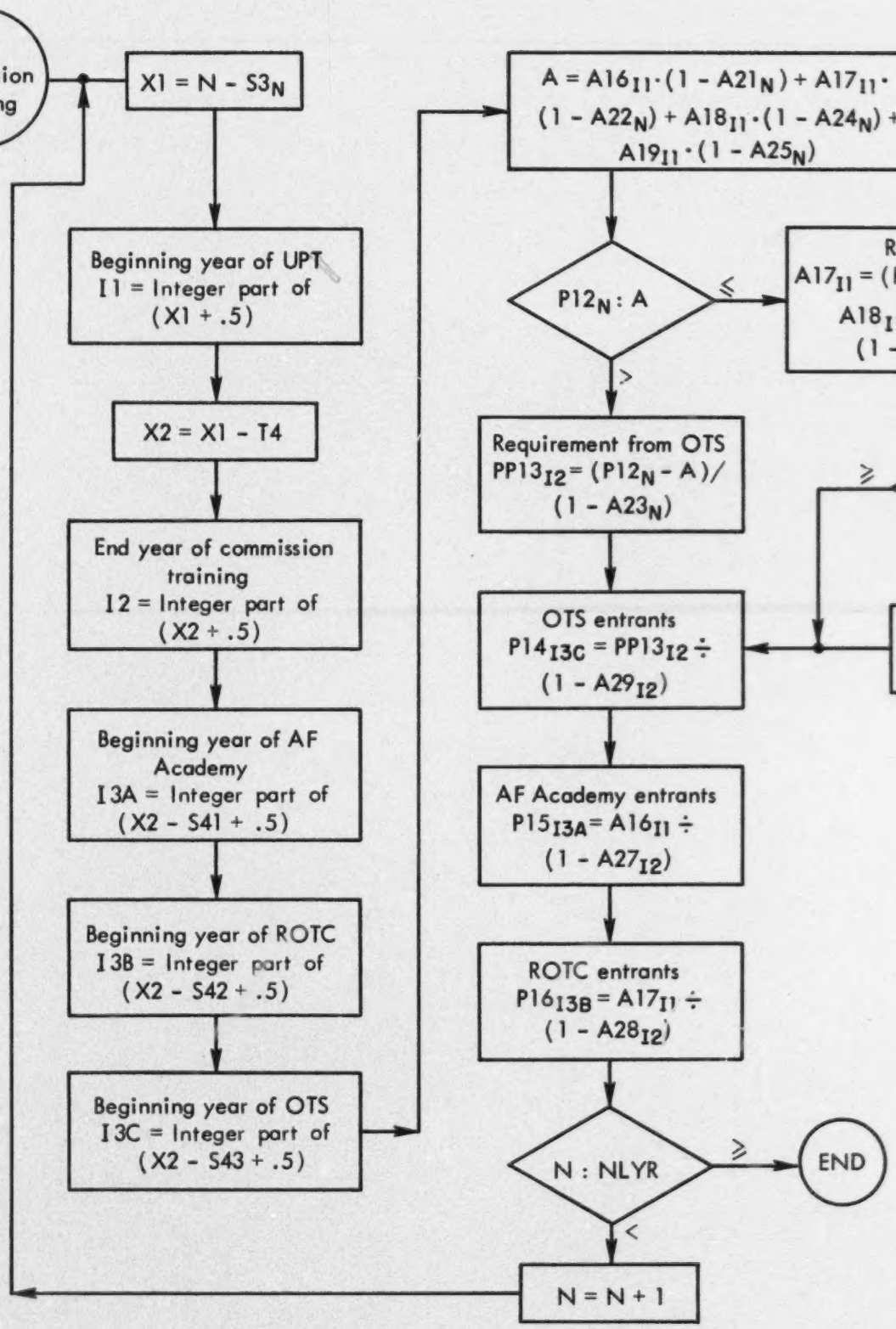

Commission training
X1 = N - S3N
Beginning year of UPT
I1 = Integer part of
(X1 + .5)
X2 = X1 - T4
End year of commission training
I2 = Integer part of
(X2 + .5)
Beginning year of AF Academy
I3A = Integer part of
(X2 - S41 + .5)
Beginning year of ROTC
I3B = Integer part of
(X2 - S42 + .5)
Beginning year of OTS
I3C = Integer part of
(X2 - S43 + .5)
A = A16I1·(1 - A21N) + A17I1·(1 - A22N) + A18I1·(1 - A24N) + A19I1·(1 - A25N)
P12N : A
≤
Reduce ROTC output
A17I1 = (P12N - A16I1·(1 - A21N) - A18I1·(1 - A24N) - A19I1·(1 - A25N)) ÷ (1 - A22N)
>
Requirement from OTS
PP13I2 = (P12N - A)/(1 - A23N)
A17I1 : 0
≥
<
OTS entrants
P14I3C = PP13I2 ÷ (1 - A29I2)
PRINT ERROR MESSAGE
AF Academy entrants
P15I3A = A16I1 ÷ (1 - A27I2)
ROTC entrants
P16I3B = A17I1 ÷ (1 - A28I2)
N : NLYR
≥
END
<
N = N + 1

Fig. 18—Flowchart of the process of scheduling pilots through commission training

Appendix

FORTRAN IV (360/65) LISTING OF PILOT MODEL COMPUTER PROGRAM

```
      COMMON/WEAP/ NA7(80), NA10(80), NA11(80), NA12(80)
      COMMON/DATA/ A1(2,80,3), A2(80,3), A5(2,80,3), A5A(2,80,3),
     1 S1(21,80,3)
      COMMON/INFO1/ A16(25), A17(25), A18(22), A19(22),
     1  A27(22), A28(22), A29(22)
      COMMON/INFO2/ A21(21), A22(21), A23(21), A24(21), A25(21), A26(21)
      DIMENSION A4(21), A6(21), A9(21), A62(21), NA63(21),
     1  S2(21), S3(21)
      DIMENSION  P1(80,3),PJ(3),P2(80,3), P3(80,3), P6(20),
     1 ICAP(21), P12(21), PJ2(80), PJ3(80)
      COMMON/SAVE/ PTG(80,21), P8S(80,21), P9S(80,21), P10S(80,21),
     1 P11S(80,21)
      DIMENSION PP13(25), P14(25), P15(25), P16(25), A20(22)
      DIMENSION CARD(20),INDC(80,3)
C
C  GIVEN A PARTICULAR WEAPON SYSTEM W,
C       NA7 IS THE AIRCRAFT TYPE,
C       NA10 IS THE CROSS TRAINING PREFERENCE INDEX FOR SOURCE A,
C       NA11 IS THE CROSS TRAINING PREFERENCE INDEX FOR SOURCE B,
C       NA12 IS THE CROSS TRAINING PREFERENCE INDEX FOR SOURCE C.
C
C  GIVEN A PARTICULAR YEAR,
C       A4 IS THE ATTRITION RATE FOR SOURCE C,
C       A6 IS THE ATTRITION RATE FOR CCTS,
C       A9 IS THE NO. OF PIPELINE PILOTS FROM UPT,
C      A62 IS UPT CAPACITY,
C     NA63 IS 0 IF UPT EXPANSION IS NOT ALLOWED,
C             1 IF UPT EXPANSION IS ALLOWED.
C       S2 IS SURVIVAL SCHOOL TRAINING TIME,
C     S3 IS UPT TRAINING TIME.
C      A16 IS THE NO. OF AF ACAD. GRAD. ENTERING UPT,
C      A17 IS THE NO. OF ROTC GRAD. ENTERING UPT,
C      A18 IS THE NO. OF RATED OFFICERS ENTERING UPT,
C      A19 IS THE NO. OF NON-RATED OFFICERS ENTERING UPT,
C      A20 IS THE NUMBER OF OTHERS LEAVING UPT,
C      A21 IS THE ATTRITION RATE IN UPT OF AF ACAD. GRADUATES,
C      A22 IS THE ATTRITION RATE IN UPT OF ROTC GRADUATES,
C      A23 IS THE ATTRITION RATE IN UPT OF OTS GRADUATES,
C      A24 IS THE ATTRITION RATE IN UPT OF RATED OFFICERS,
C      A25 IS THE ATTRITION RATE IN UPT OF NON-RATED OFFICERS,
C      A26 IS THE ATTRITION RATE IN UPT OF OTHERS,
C      A27 IS THE ATTRITION RATE IN THE AF ACAD.,
C      A28 IS THE ATTRITION RATE IN ROTC,
C      A29 IS THE ATTRITION RATE IN OTS.
      CONTINUE
C
C
C  GIVEN A PARTICULAR YEAR,WEAPON SYSTEM, AND PILTOT TYPE,
C       A1 IS THE PILOT INVENTORY,
C       A2 IS THE PERCENT REQUIRED FOR SOURCE A,
C       A5 IS THE ATTRITION RATE FOR PEOPLE LEAVING SERVICE,
C      A5A IS THE ATIRITION RATE FOR PEOPLE LEAVING WEAPON SYSTEM FOR
```

```
C          DESK JOBS.
C         S1 IS THE TRAINING TIME REQUIRED FOR CCTS.
C
C
C  READ IN RUN DESCRIPTION.
C
      READ(5,1000) (CARD(I), I = 1,20)
 1000 FORMAT(20A4)
C
      WRITE(6,1001) (CARD(I), I = 1,20)
 1001 FORMAT(1H1,25X,20A4)
C
C  READ IN BASE YEAR, LAST YEAR, AND NUMBER OF WEAPON SYSTEMS.
C
      READ(5,1002) I, NBYR,NLYR, NWPN
 1002 FORMAT(I1,3X,3(I2,4X))
      IF(I.EQ.1) GO TO 2
      WRITE(6,2001)
 2001 FORMAT(36H1'1' CARD IS MISSING FROM INPUT DECK)
      CALL EXIT
C
C
C  READ T1, T2, T3, T4, S41, S42, S43, A64,A3,A65,NA66,A67
C
C  T1 IS TRAVEL + LEAVE TIME AFTER CCTS,
C  T2 IS TRAVEL + LEAVE TIME AFTER SURVIVAL SCHOOL,
C  T3 IS TRAVEL + LEAVE TIME AFTER UPT,
C  T4 IS TRAVEL + LEAVE TIME BEFORE UPT,
C  S41 IS TRAINING TIME FOR THE ACADEMY,
C  S42 IS TRAINING TIME FOR ROTC,
C  S43 IS TRAINING TIME FOR OTS,
C  A64 IS UPT EXPANSION TIME.
C  A3 IS NO. OF DESK JOB PILOTS IN BASE YEAR,
C  A65 IS OTS CAPACITY
C  NA66 IS 1 IF OTS EXPANSION IS ALLOWED, 0 IF OTS EXPANSION IS NOT ALLOWED.
C  A67 IS OTS EXPANSION TIME.
C
    2 CALL READ2(T1,T2,T3,T4,S41,S42,S43,A64, A3,DUMMY,A65, NA66, A67)
C
C
C  READ IN NA7, NA10, NA11, NA12 FOR ALL WEAPON SYSTEMS
C
C
      CALL READ4
C
C
C
C  INITIALIZE VARIABLES
C
    5 NY = 0
      X1 = 0.
      X2 = 0.
      X3 = 0.
      X3A = 0.
      DO 6 I = 1,2
      DO 6 J = 1,NWPN
```

```
      DO 6 K = 1,3
      A1(I,J,K) = 0.
      A5(I,J,K) = 0.
      A5A(I,J,K) = 0.
      IF(I.EQ.1) GO TO 6
      A2(J,K) = 0.
      INDC(J,K) = 0
    6 CONTINUE
      DO 7 I = 1,21
      ICAP(I) = 0
    7 P12(I) = 0.
      DO 8 I = 1,NWPN
      DO 8 J = 1,21
      PTG(I,J) = 0.
      P8S(I,J) = 0.
      P9S(I,J) = 0.
      P10S(I,J) = 0.
    8 P11S(I,J) = 0.
C
C  READ A4, A6, A9, A62, A63, A20, A64, S2, S3 FOR ONE YEAR
C
   18 IF(NY.EQ.0) NY = 21
      READ(5,1004) I, A4(NY), A6(NY), A9(NY), A62(NY), NA63(NY),
     1             A20(NY), S2(NY), S3(NY), NYR
 1004 FORMAT(I1,F4.3,5X,F5.4,5X,2(F6.0,4X),I1,4X,      F6.0,4X,
     1   2(F5.0,5X),3X,I2)
      IF(I.EQ.6) GO TO 10
      WRITE(6,1040)
 1040 FORMAT(25H1A TYPE 6 CARD IS MISSING)
      CALL EXIT
C
   10 IF(NYR.EQ.(NY + NBYR)) GO TO 16
      IF((NYR.EQ.NBYR).AND.(NY.EQ.21)) GO TO 16
      WRITE(6,1140)
 1140 FORMAT(44H1TYPE 6 CARD DOES NOT CONTAIN THE RIGHT YEAR)
      CALL EXIT
C
C
C  CONVERT      S2, S3 FROM DAYS TO FRACTIONS OF A YEAR.
C
   16 S2(NY) = S2(NY)/365.
      S3(NY) = S3(NY)/365.
      IF(NY.EQ.21) NY = 0
C
C     READ IN A1, A2, A5, A5A AND S1 FOR ONE YEAR, ALL WEAPON SYSTEMS AND
C     PILOT TYPES.
C
      ICAV = 0
C
   17 CALL READS(NY,NBYR,NW,NTP,IC)
C
C
      IF(NY.NE.1) GO TO 19
C
C  IF NY IS FIRST YEAR, ACCUMULATE INFORMATION TO COMPUTE A2BAR.
C  A2BAR WILL REPLACE A2 FOR ALL REQUIREMENTS IN FIRST YEAR FOR WHICH
```

```
C   THOSE PILOTS LEAVE UPT IN THE BASE YEAR.  IF THEY LEAVE BEFORE OR AFTER
C   THE BASE YEAR INFORMATION ABOUT THESE PILOTS WILL NOT BE USED IN
C   COMPUTING A2BAR.
C
       Y1 = 1. - T1
       I1 = INT(Y1 + .5)
       IF(I1.EQ.0) I1 = 21
       Y2 = Y1 - S1(I1,NW,NTP) - T2
       I2 = INT(Y2 + .5)
       Y3 = Y2 - S2(I2) - T3
       IF(Y3.GT..5) GO TO 19
       IF(Y3.LT.(-.5)) GO TO 15
       IF(A1(2,NW,NTP).LT.(A1(1,NW,NTP)*(1.-A5(1,NW,NTP)))) GO TO 19
C
C   ACCUMULATE INFORMATION TO COMPUTE A2BAR.
C
       X1 = X1 + A1(1,NW,NTP)*(1. - A5(1,NW,NTP))
       X2 = X2 + A1(1,NW,NTP)
       X3 = X3 + A1(2,NW,NTP)
       X3A = X3A + A5A(1,NW,NTP)
       IF(A5A(1,NW,NTP).NE.0.) ICAV = ICAV + 1
C
C   SET AN INDICATOR TO INDICATE THAT THE PILOTS REQUIRED IN YEAR 1,
C   WEAPON SYSTEM NW, AND PILOT TYPE NTP WILL COME FROM THE BASE YEAR
C   UPT PIPELINE.
C
       INDC(NW,NTP) = 2
       GO TO 19
C
C   FOR WEAPON SYSTEM NW AND PILOT TYPE NTP, THE PILOTS REQUIRED IN THE
C   FIRST YEAR WILL LEAVE UPT BEFORE THE BASE YEAR.  SET INDC = 1 TO INDICATE
C   THAT THE PILOT REQUIREMENTS WILL BE SATISFIED FROM CCTS INVENTORY
C   IN THE BASE YEAR.
C
   15  INDC(NW,NTP) = 1
C
   19  IF(IC.EQ.9) GO TO 20
       GO TO 17
   20  IF(NY.NE.0) GO TO 11
C
       GO TO 61
C
   11  IF(NY.NE.1) GO TO 21
C
C   COMPUTE A2BAR
C
       A2BAR = 0.
       A5ABAR = 0.
       IF(ICAV.EQ.0) GO TO 27
       A5ABAR = X3A/ICAV
   27  IF(X3.EQ.X1) GO TO 21
       A2BAR = A9(21)*(1. - A6(NY))/(X3 - X1)
       IF(A2BAR.LE.1.) GO TO 22
   23  IF(X2.EQ.0.) GO TO 24
       A5ABAR = A5ABAR + (A9(21)*(1. - A6(NY)) + X1 - X3)/X2
   24  DO 26 I = 1,NWPN
```

```
      DO 26 J = 1,3
      IF(INDC(I,J).NE.2) GO TO 26
      X4 = X4 + A1(1,I,J)*(1. - A2ABAR - A5(1,I,J))
   26 CONTINUE
      A2BAR = 0.
      IF((X3 - X4).EQ.0.) GO TO 21
      A2BAR = A9(21)*(1. - A6(NY))/(X3 - X4)
      GO TO 21
   22 IF(A2BAR.GE.0.) GO TO 21
      GO TO 23
C
C
   21 P4 = 0.
      P5 = 0.
      DO 50 NW = 1,NWPN
      DO 51 NTP = 1,3
      IF((NY.EQ.1).AND.(INDC(NW,NTP).EQ.2)) A2(NW,NTP) = A2BAR
C
C     FOR   A PARTICULAR YEAR, WEAPON SYSTEM AND PILOT TYPE, P1 IS THE
C  PILOT REQUIREMENT AND PJ IS THE PILOT INVENTORY AT  THE END OF THE
C  PRECEDING YEAR.
C
      PJ(NTP) =   A1(1,NW,NTP)*(1.-A5(1,NW,NTP)-A5A(1,NW,NTP))
   51 P1(NW,NTP) = A1(2,NW,NTP) - PJ(NTP)
C
C  CHECK WHETHER THIS YEAR'S TYPE 1 OR TYPE 2 PILOT REQUIREMENT CAN BE FILLED
C  BY LAST YEAR'S TYPE 2 OR TYPE 3 PILOT INVENTORY.
C  PJ2 AND PJ3 WILL CONTAIN THE NO. OF UPGRADED TYPE 2 AND TYPE 3 PILOTS
C  RESPECTIVELY.
C
      IF(P1(NW,1).LT.0.) GO TO 52
      IF(P1(NW,1).LE.(PJ(2) + PJ(3))) GO TO 53
C
C  P1 FOR PILOT TYPE 1 CAN BE PARTIALLY FILLED BY LAST YEAR'S TYPE 2 AND
C  TYPE 3 INVENTORY, PJ(2) AND PJ(3).
C
      P1(NW,2) = P1(NW,2) + PJ(2)
      P1(NW,3) = P1(NW,3) + PJ(3)
      P1(NW,1) = P1(NW,1) - PJ(2) - PJ(3)
      PJ(1) = PJ(1) + PJ(2) + PJ(3)
      PJ2(NW) = PJ(2)
      PJ3(NW) = PJ(3)
      PJ(2) = 0.
      PJ(3) = 0.
      GO TO 49
C
   52 PJ2(NW) = 0.
      PJ3(NW) = 0.
   57 IF(P1(NW,2).GE.0.) GO TO 55
      GO TO 49
C
   53 IF(P1(NW,1).LE.PJ(2)) GO TO 54
C
C  P1 FOR PILOT TYPE 1 CAN BE FILLED BY LAST YEAR'S PILOT TYPE 2 AND TYPE 3
C  INVENTORY, PJ(2) AND PJ(3).
C
```

```
      PJ(1) = PJ(1) + P1(NW,1)
      P1(NW,1) = P1(NW,1) - PJ(2)
      P1(NW,2) = P1(NW,2) + PJ(2)
      PJ(3) = PJ(3) - P1(NW,1)
      P1(NW,3) = P1(NW,3) + P1(NW,1)
      PJ2(NW) = PJ(2)
      PJ3(NW) = P1(NW,1)
      PJ(2) = 0.
      P1(NW,1) = 0.
      GO TO 57
C
C
C  P1 FOR PILOT TYPE 1 CAN BE FILLED BY LAST YEAR'S PILOT TYPE 2 INVENTORY.
C
   54 PJ(1) = PJ(1) + P1(NW,1)
      PJ(2) = PJ(2) - P1(NW,1)
      P1(NW,2) = P1(NW,2) + P1(NW,1)
      PJ2(NW) = P1(NW,1)
      PJ3(NW) = 0.
      P1(NW,1)=0.
      IF(P1(NW,3).GT.0.) GO TO 57
      IF(PJ(3).LE.0.) GO TO 49
C
   55 IF(P1(NW,2).LE.PJ(3)) GO TO 56
C
C  P1 FOR PILOT TYPE 2 CAN BE PARTIALLY FILLED BY LAST YEAR'S PILOT TYPE 3
C  INVENTORY.
C
      P1(NW,2) = P1(NW,2) - PJ(3)
      PJ(2) = PJ(2) + PJ(3)
      P1(NW,3) = P1(NW,3) + PJ(3)
      PJ3(NW) = PJ3(NW) + PJ(3)
      PJ(3) = 0.
      GO TO 49
C
C  P1 FOR PILOT TYPE 2 CAN BE FILLED BY LAST YEAR'S PILOT TYPE 3 INVENTORY.
C
   56 PJ(3) = PJ(3) - P1(NW,2)
      P1(NW,3) = P1(NW,3) + P1(NW,2)
      PJ(2) = PJ(2) + P1(NW,2)
      PJ3(NW) = PJ3(NW) + P1(NW,2)
      P1(NW,2) = 0.
      GO TO 49
C
   49 DO 50 NTP = 1,3
      IF(P1(NW,NTP).GE.0.) GO TO 30
C
      P2(NW,NTP) = 0.
      P3(NW,NTP) = 0.
C
C
C  SURPLUS EXISTS - LAST YEAR'S INVENTORY EXCEEDS THIS YEAR'S REQUIRED
C  INVENTORY.
C
      IF(NA7(NW).EQ.1) GO TO 25
C
```

```
C  ASSIGN SURPLUS TO FIGHTER GROUP
C
      P5 = P5 - P1(NW,NTP)
      GO TO 50
C
C  ASSIGN SURPLUS TO BOMBER/CARGO GROUP
C
   25 P4 = P4 - P1(NW,NTP)
      GO TO 50
C
C  PILOT REQUIREMENT EXISTS FOR PRESENT YEAR, GET NUMBER
C     OF GRADUATES DESIRED FROM EACH SOURCE IN PRESENT YEAR.
C
C  NEW PEOPLE GRADUATES
C
   30 IF((NY.EQ.1).AND.(INDC(NW,NTP).EQ.1)) GO TO 31
      P2(NW,NTP) = A2(NW,NTP)*P1(NW,NTP)
C
C  CROSS TRAINING GRADUATES
C
      P3(NW,NTP) =(1. - A2(NW,NTP))*P1(NW,NTP)
      GO TO 50
   31 P2(NW,NTP) = 0.
      P3(NW,NTP) = 0.
C
   50 CONTINUE
C
C  IF NY = 1, CHECK IF THOSE UPT REQUIREMENTS P2, THAT WILL BE TAKEN
C   FROM THE BASE YEAR PIPELINE, DEPLETE THE PIPELINE.  IF NOT, ADD THOSE
C     SURPLUS PIPELINE PILOTS INTO THE DESK JOB INVENTORY AT END OF FIRST YEAR.
C
      SURPLS = 0.
      IF(NY.NE.1) GO TO 63
      PIPEL = 0.
      DO 65 I = 1,NWPN
      DO 65 J = 1,3
      IF(INDC(I,J).NE.2) GO TO 65
      PIPEL = PIPEL + P2(I,J)/(1. - A6(1))
   65 CONTINUE
      IF(PIPEL.GE.A9(21)) GO TO 63
      SURPLS = (A9(21) - PIPEL)*(1. - A6(1))
C
C  INITIALIZE P6 WHERE P6 WILL ACCUMULATE THE DESK JOB INVENTORY FOR THIS YEAR.
C
   63 P6(NY) = 0.
C
      IF(NY.EQ.1) GO TO 101
      PP6 = P6(NY - 1)
      GO TO 102
  101 PP6 = A3
C
C  TRY TO FILL REQUIREMENTS FOR ONE YEAR, ALL WEAPON SYSTEMS AND PILOT TYPES.
C
  102 NW = 1
      NTP = 1
C
```

```
C  IS THERE A NEW PEOPLE REQUIREMENT
C
  100 P11 = 0.
      P3A = P3(NW,NTP)
      IF(P2(NW,NTP).LE.0.) GO TO 500
C
C  THERE IS A NEW PEOPLE REQUIREMENT
C
      IND = 0
C
C CHECK IF ENOUGH TIME HAS ELAPSED TO TRAIN NEW PEOPLE
C   GIVEN YEAR NY TO BE THE YEAR IN WHICH PILOTS ARE NEEDED, GOING BACK IN TIME
C        I1 IS THE END YEAR OF CCTS,
C        I4 IS THE BEGINNING YEAR OF CCTS,
C        I2 IS THE END YEAR OF SURVIVAL SCHOOL,
C        I3 IS THE END YEAR OF UPT.
C
  105 XN = NY
      X1 = XN - T1
C
      IF(X1.LT.(-.5)) GO TO 200
      I1 = INT(X1 + .5)
      IF(I1.EQ.0) I1 = 21
C
      I4 = INT(X1 - S1(I1,NW,NTP) + .5)
      IF(I4.EQ.0) I4 = 21
C
      X2 = X1 - S1(I1,NW,NTP) - T2
C
      IF(X2.LT.(-.5)) GO TO 200
      I2 = INT(X2 + .5)
      IF(I2.EQ.0) I2 = 21
C
      X3 = X2 - S2(I2) - T3
C
      IF(X3.LT.(-.5)) GO TO 200
      I3 = INT(X3 + .5)
      IF(I3.EQ.0) I3 = 21
C
      X4 = X3 - S3(I3) - T4
C
      IF(X4.LT.(-.5)) GO TO 200
C
C  ENOUGHT TIME HAS ELAPSED
C
      IPIPE = 0
C
      IF(IND.NE.0) GO TO 250
C
C  NEW PEOPLE REQUIRED TO GO INTO CCTS IN YEAR I4
C
  110 P11 = P2(NW,NTP)/(1. - A6(I1))
      P11S(NW,I4) = P11S(NW,I4) + P11
C
C  UPT GRADUATES NECESSARY IN YEAR I3
C
```

```
      P12(I3) = P12(I3) + P11
      IF(IPIPE.NE.0) GO TO 500
C
C  CHECK WHETHER UPT GRADUATES NECESSARY IN YEAR I3 HAVE ALREADY EXCEEDED
C  UPT CAPACITY.
C
C
C  ICAP(I3) = 0 IF UPT CAPACITY HAS NOT  BEEN EXCEEDED,
C   ICAP(I3) = 1 IF UPT CAPACITY HAS BEEN EXCEEDED BUT UPT EXPANSION IS
C     ALLOWED AND THERE IS ENOUGH TIME TO EXPAND,
C    ICAP(I3) = 2 IF UPT CAPACITY HAS BEEN EXCEEDED AND EITHER
C     1) NO EXPANSION SI ALLOWED OR 2) EXPANSION IS ALLOWED BUT THERE IS NO
C     TIME TO EXPAND.
C
  153 IF(ICAP(I3).EQ.0) GO TO 130
      IF(ICAP(I3).EQ.1) GO TO 154
C
C  ICAP(I3) = 2, UPT CANNOT HANDLE THESE ADDITIONAL PEOPLE. CROSS TRAIN
C    THESE PEOPLE (P7).
C
      IF(IND.NE.0) GO TO 1510
      P7 = P11
      GO TO 150
 1510 P7 = P13
      GO TO 150
C
C  CAPACITY HAS NOT ALREADY BEEN EXCEEDED.
C  CHECK WHETER ADDITIONAL UPT REQUIREMENT EXCEEDS CAPACITY.
C
  130 IF((P12(I3)+A20(I3)).LE.A62(I3)) GO TO 154
C
C  CAPACITY HAS BEEN EXCEEDED FOR FIRST TIME THAT YEAR.
C  CHECK WHETHER EXPANSION IS ALLOWED.
C
      IF(NA63(I3).EQ.0) GO TO 145
C
C  EXPANSION IS ALLOWED.
C  CJECK WHETHER TIME EXISTS TO EXPAND
C
      IF((X4 - A64).LT.0.) GO TO 145
C
C  TIME EXISTS
C
      ICAP(I3) = 1
C
C   SINCE UPT HAS BEEN EXPANDED THIS YEAR, IN ALL SUCCESSIVE YEARS
C     UPT REQUIREMNTS CAN ALL BE HANDLED.
C
      NN = NLYR - NBYR
      II = I3 + 1
      DO 900 IJ = II,NN
  900 ICAP(IJ) = 1
C
      GO TO 154
C
C  NO EXPANSION ALLOWED OR NOT TIME TO EXPAND
```

```
C
  145 P7 = P12(I3) - A62(I3) + A20(I3)
      ICAP(I3) = 2
  150 P12(I3) = A62(I3) - A20(I3)
      P11 = P11 - P7
      P11S(NW,I4) = P11S(NW,I4) - P7
      IF(IND.EQ.1) GO TO 155
      P3(NW,NTP) = P3(NW,NTP) + P7*(1. - A6(I1))
      GO TO 500
C
C  UPT CAPACITY HAS BEEN EXCEEDED BUT EXPANSION IS ALLOWED AND THERE IS
C  ENOUGH TIME TO EXPAND.
C
  154 IF(IND.EQ.0) GO TO 500
      GO TO 600
C
  155 NYEAR = NY + NBYR
      WRITE(6,4010) NYEAR, NW, NTP
 4010 FORMAT(27HORESERVES HAVE BEEN CALLED./5X,9HFOR YEAR ,I2,11H, WP. S
     1YS. ,I2,13H, PILOT TYPE ,I1,69H, CROSS TRAINING REQUIREMENT CANNOT
     2 BE FILLED THROUGH CROSS TRAINING./5X,112HTHERE IS ENOUGH TIME TO
     3TRAIN NEW PEOPLE, BUT UPT CAPACITY HAS BEEN EXCEEDED AND EITHER EX
     4PANSION IS NOT ALLOWED/5X, 43H OR THERE IS NOT ENOUGH TIME TO EXPA
     5ND UPT.)
      GO TO 600
C
C  NOT ENOUGH TIME TO TRAIN NEW PEOPLE
C
  200 IPIPE = 1
C
      I4 = INT(X1 - S1(I1,NW,NTP) + .5)
      IF(I4.EQ.0) I4 = 21
C
      IF(IND.NE.0) GO TO 151
C
      P = P2(NW,NTP)/(1. - A6(I1))
      GO TO 152
  151 P = P3(NW,NTP)/(1. - A6(I1))
C
C  TRY TO FILL REQUIREMENT WITH PIPELINE PILOTS.
C
  152 IF(P.GT.A9(I3)) GO TO 160
C
C  NEW PEOPLE REQUIREMENT LESS THAN PIPELINE
C  FILL REQUIREMENT WITH PIPELINE PILOTS
C
      A9(I3) = A9(I3) - P
C
      IF(IND.EQ.0) GO TO 110
      GO TO 250
C
C  NEW PEOPLE REQUIREMENT EXCEEDS PIPELINE
C
  160 P11 = A9(I3)
      P12(I3) = P12(I3) + P11
      P11S(NW,I4) = P11S(NW,I4) + P11
```

```
C
C   IF NEW PEOPLE REQUIREMENT CANNOT BE FILLED BY PIPELINE, CROSS TRAIN THE
C   REMAINDER.
C
      IF(IND.EQ.0) GO TO 165
C
C   CROSS TRAINED PILOTS DO NOT FILL CROSS TRAINING REQUIREMENT, AND
C      THERE IS NOT ENOUGH TIME TO TRAIN NEW PEOPLE.
C
      NYEAR = NY + NBYR
      WRITE(6,4013) NYEAR, NW, NTP
 4013 FORMAT(27HORESERVES HAVE BEEN CALLED./5X,9HFOR YEAR ,I2,11H, WP. S
     1YS. ,I2,13H, PILOT TYPE ,I1,69H, CROSS TRAINING REQUIREMENT CANNOT
     2 BE FILLED THROUGH CROSS TRAINING./5X,102HTHERE IS NOT ENOUGH TIME
     3 TO TRAIN NEW PEOPLE AND THERE ARE NOT ENOUGH PIPELINE PILOTS TO F
     4ILL DEFICIT.)
C
C
C   CALL RESERVES
C   PRINT ERROR MESSAGE
C
      GO TO 600
C
  165 P7 = P2(NW,NTP) - A9(I3)*(1. - A6(I1))
      A9(I3) = 0.
      P3(NW,NTP) = P3(NW,NTP) + P7
C
      GO TO 500
  250 P13 = P3(NW,NTP)/(1. - A6(I1))
      P11 = P11 + P13
      P12(I3) = P12(I3) + P13
      P11S(NW,I4) = P11S(NW,I4) + P13
C
      IF(IPIPE.NE.0) GO TO 600
      GO TO 153
C
  500 P8 = 0.
      P9 = 0.
      P10 = 0.
      IF(P3(NW,NTP).GT.0.) GO TO 725
C
  600 XN = NY
      I1 = INT(XN - T1 + .5)
      PP = A5A(1,NW,NTP)*A1(1,NW,NTP) - P10 + A6(I1)*(P8+P9+P10+P11)
      P6(NY) = P6(NY) + PP
      IF(P3(NW,NTP).LE.0.) GO TO 8000
      IF(I4.EQ.999) GO TO 8000
      P8S(NW,I4) = P8S(NW,I4) + P8
      IF(I41.EQ.999) GO TO 8000
      P9S(NW,I41)= P9S(NW,I41)+ P9
      P10S(NW,I41)= P10S(NW,I41)+ P10
 8000 P3F = (P8 + P9 + P10)*(1. - A6(I1))
      P11 = P11*(1. - A6(I1))
      PTG(NW,NY) = PTG(NW,NY) + P11 + P3F
      GO TO 8002
```

```
 8002 NYEAR = NY + N8YR
      A = A1(2,NW,NTP)*A5(2,NW,NTP)
      AA = A1(2,NW,NTP)*A5A(2,NW,NTP)
C
      IF(NTP.EQ.1) UPG = 0.
      IF(NTP.EQ.2) UPG = PJ2(NW)
      IF(NTP.EQ.3) UPG = PJ3(NW)
C
      WRITE(6,2012) NYEAR,NW,NTP,A1(2,NW,NTP),A,AA,P1(NW,NTP),
     1 P2(NW,NTP), P11, P3A, P3F, UPG
 2012 FORMAT(1HO,I2,4X,I2,6X,I1,3X,F6.0,1X,F9.2,2X,F9.2,2X,F9.2,3X,
     1 F9.2,4X,F9.2,6X,F9.2,8X,F9.2,6X,F9.2)
C
C  ACCUMULATE YEAR'S TOTALS
C
      Z1 = Z1 + A1(2,NW,NTP)
      Z2 = Z2 + A
      Z3 = Z3 + AA
      Z4 = Z4 + P1(NW,NTP)
      Z5 = Z5 + P2(NW,NTP)
      Z6 = Z6 + P11
      Z7 = Z7 + P3A
      Z8 = Z8 + P3F
      Z9 = Z9 + UPG
C
      LINES = LINES + 2
      IF(LINES.LT.55) GO TO 603
      WRITE(6,2010)
      WRITE(6,2011)
      LINES = 8
C
  603 IF(NTP.GE.3) GO TO 650
      NTP = NTP + 1
      GO TO 100
  650 IF(NW.GE.NWPN) GO TO 700
      NW = NW + 1
      NTP = 1
      GO TO 100
C
C
C  CHECK CROSS TRAINING SOURCES TO FILL CROSS TRAINING REQUIREMENT.
C
  725 IND = 1
      XN = NY
      I1 = INT(XN - T1 + .5)
      I4 = INT(XN - T1 - S1(I1,NW,NTP) + .5)
      IF(I4.EQ.0) I4 = 21
      IF(I4.LT.0) I4 = 999
C
C  IP STORES THE PREFERENCE NO. OF THE SOURCE BEING USED.
C
  750 IF((NY.NE.1).OR.(INDC(NW,NTP).NE.1)) GO TO 751
      IS = 3
      GO TO 760
  751 IP = 1
C
```

```
C  FIND THE SOURCE WITH PREFERENCE NO. IP
C
  755 IF(NA10(NW).NE.IP) GO TO 770
C
C  SOURCE A HAS PREFERENCE NO. IP
C
      IS = 1
      GO TO 760
  770 IF(NA11(NW).NE.IP) GO TO 780
C
C  SOURCE B HAS PREFERENCE NO. IP
C
      IS = 2
      GO TO 760
  780 IF(NA12(NW).NE.IP) GO TO 790
C
C  SOURCE C HAS PREFERENCE NO. IP
C
      IS = 3
      GO TO 760
  790 WRITE(6,3090)
 3090 FORMAT(74H1PREFERENCE NO. HAS NOT BEEN ASSIGNED TO ONE OF THE CROS
     1S TRAINING SOURCES)
      CALL EXIT
C
C  CHECK WHETHER ENOUGH TIME EXISTS TO CROSS TRAIN IN THIS SOURCE
C
  760 XN = NY
C
      IF((NTP.EQ.1).AND.((IS.EQ.2).OR.(IS.EQ.3))) GO TO 761
      S = S1(I1,NW,NTP)
      I41 = I4
      GO TO 762
  761 S = S1(I1,NW,2)
      I41 = INT(XN - T1 - S + .5)
      IF(I41.EQ.0) I41 = 21
      IF(I41.LT.0) I4 = 999
C
  762 TIME = T1 + S
C
      IF(TIME.LE.XN) GO TO 765
      IF((NY.EQ.1).AND.(INDC(NW,NTP).EQ.1)) GO TO 765
C
C  THERE IS NOT ENOUGH TIME TO CROSS TRAIN IN THIS SOURCE.
C  CHECK WHETHER THIS SOURCE HAS PREFERENCE 3.
C  IF SO, CALL RESERVES.
C  IF NOT, FIND SOURCE THAT IS NEXT PREFERRED.
C
      IP = IP + 1
      IF(IP.GT.3) GO TO 767
      GO TO 755
C
C  ENOUGH TIME EXISTS TO CROSS TRIN IN THIS SOURCE
C
  765 IF(IS.EQ.3) GO TO 785
      IF((NA7(NW).EQ.1).AND.(IS.EQ.1)) GO TO 775
```

```
      IF((NA7(NW).EQ.0).AND.(IS.EQ.2)) GO TO 775
      CALL CROSS(A6(I1), P3(NW,NTP), P5,              P, IC, 0)
      GO TO 800
  775 CALL CROSS(A6(I1), P3(NW,NTP), P4,              P, IC, 0)
      GO TO 800
  785 CALL CROSS(A6(I1), P3(NW,NTP), PP6,                 P, IC, 1)
  800 IF(IS.EQ.1) P8 = P
      IF(IS.EQ.2) P9 = P
      IF(IS.EQ.3) P10 = P
C
C  CHECK WHETHER SOURCE HAS FILLED CROSS TRAINING REQUIREMENT.
C  IC = 1 MEANS SOURCE HAS FILLED REQUIREMENT.
C  IC = 2 MEANS SOURCE HAS NOT FILLED REQUIREMENT
C
      IF(IC.EQ.1) GO TO 600
C
C  PREFERRED SOURCE HAS NOT FILLED CROSS TRAINING REQUIREMENT.
C  CHECK WHETHER ALL SOURCES HAVE BEEN CONSIDERED.
C  IF NOT, CHECK FOR NEXT PREFERRED SOURCE.
C  IF ALL SOURCES HAVE BEEN CONSIDERED, CHECK WHETHER THE
C     CROSS TRAINED PEOPLE ARE NEEDED TO SUPPLEMENT NEW PEOPLE REQ.
C
  766 IP = IP + 1
      IF(IP.LE.3) GO TO 755
      IF(IND.NE.0) GO TO 105
C
C  CALL RESERVES
C  PRINT ERROR MESSAGE
C
  767 NYEAR = NY + NBYR
      WRITE(6,4020) NYEAR,NW,NTP
 4020 FORMAT(27HORESERVES HAVE BEEN CALLED./5X,9HFOR YEAR ,I2,11H, WP. S
     1YS. ,I2,13H, PILOT TYPE ,I2,80H, CROSS TRAINING REQUIREMENT (WHICH
     2 INCLUDES PART OF THE NEW PEOPLE REQUIREMENT)/5X,17HCANNOT BE FILL
     3ED.)
      GO TO 600
C
C  COMPUTE THE DESK JOB INVENTORY FOR YEAR NY.
C
  700 IF(NY.EQ.1) GO TO 90
      P6(NY) = P6(NY) + (1. - A4(NY - 1))*P6(NY - 1) + P4 + P5
      GO TO 95
   90 P6(NY) = P6(NY) + (1. - A4(21))*A3          + P4 + P5 + SURPLS
C
C  SET NUMBER OF UPT GRADUATES IN BASE YEAR
C
      P12(21) = P12(21) + SURPLS/(1. - A6(1)) - A20(21)
C
   95 IF(P6(NY).GE.0.) GO TO 96
C
C  DESK JOB INVENTORY IN YEAR NY IS NEGATIVE.
C  PROGRAM EXECUTION HAS BEEN HALTED.
C
      NYEAR = NBYR + NY
      WRITE(6,97) NYEAR
   97 FORMAT(39H1DESK JOB INVENTORY AT THE END OF YEAR ,I2,13H IS NEGATI
```

```
      1VE./38HOPROGRAM EXECUTION HAS BEEN TERMINATED)
       CALL EXIT
C
   96 DO 60 J = 1,NWPN
      DO 60 K = 1,3
      A1(1,J,K) = A1(2,J,K)
      A5(1,J,K) = A5(2,J,K)
      A5A(1,J,K) = A5A(2,J,K)
      A1(2,J,K) = 0.
      A2(J,K) = 0.
      A5(2,J,K) = 0.
   60 A5A(2,J,K) = 0.
C
C  WRITE YEAR'S TOTALS
C
      WRITE(6,4021) Z1, Z2, Z3, Z4, Z5, Z6, Z7, Z8,Z9
 4021 FORMAT(14HOYEAR'S TOTALS,4X,F7.0,1X,F9.2,2X,F9.2,2X,F9.2,3X,F9.2,
     14X,F9.2,6X,F9.2,8X,F9.2,6X,F9.2)
C
   61 Z1 = 0.
      Z2 = 0.
      Z3 = 0.
      Z4 = 0.
      Z5 = 0.
      Z6 = 0.
      Z7 = 0.
      Z8 = 0.
      Z9 = 0.
C
      NY = NY + 1
      IF(NY.GT.(NLYR - NBYR)) GO TO 2000
      WRITE(6,2010)
 2010 FORMAT(1H1,47X,37HPILOT MODEL OUTPUT - MAIN INFORMATION//)
      WRITE(6,2011)
 2011 FORMAT(3HOYR,2X,6HWEAPON,2X,5HPILOT,2X,5HPILOT,2X,9HLOSS FROM,3X,
     1 7HLOSS TO,3X,8HNET REQ/,3X,11HNO. DESIRED,2X,12HNO. OBTAINED,3X,
     2 11HNO. DESIRED,6X,12HNO. OBTAINED,6X,6HPILOTS/7X,3HSYS,4X,
     3 4HTYPE,3X,3HREQ,6X,4HUSAF,4X,9HDESK JOBS,2X,9HSURPLUSES,3X,
     4 8HTHRU UPT,5X,8HTHRU UPT,5X,15HTHRU X TRAINING,2X,
     5 15HTHRU X TRAINING,3X,8HUPGRADED/24X,24H(YEAR'S END)(YEAR'S END)/
     6)
      LINES = 8
      GO TO 18
C
 2000 CALL OUTPUT(NBYR,NLYR,NWPN)
C
      WRITE(6,2020)
 2020 FORMAT(1H1,45X,42HINVENTORY OF DESK JOB PILOTS AT YEAR'S END/)
      NN = NLYR - NBYR
      DO 925 I = 1,NN
      NNY = I + NBYR
  925 WRITE(6,2021) NNY, P6(I)
 2021 FORMAT(1H0,I2,12X,F9.2)
C
C
C
```

```
C  READ IN A16, A17, A18, A19, A20, A27, A28, A29 FOR
C     THE BASE YEAR AND ALL SUCCESSIVE YEARS
C
      CALL READ7(NBYR)
C
C  READ IN A21, A22, A23, A24, A25, A26  FOR THE YEAR AFTER THE BASE YEAR
C     AND ALL SUCCESSIVE YEARS
C
      CALL READ8(NBYR)
C
C
      DO 5015 I = 1,25
      PP13(I) = 0.
      P14(I) = 0.
      P15(I) = 0.
 5015 P16(I) = 0.
C
C
C  GIVEN  THE UPT GRADUATES IN A PARTICULAR YEAR N,  COMPUTE THE
C     NO. OF PILOTS ENTERING OTS IN YEAR I3C, AF ACAD IN YEAR I3A,
C     ROTC IN YEAR I3B.
C  I1 IS THE BEGINNING YEAR OF UPT  IF THE LAST YEAR IS N
C  I2  IS THE LAST YEAR OF COMMISSION TRAINING IF THE LAST YEAR
C     OF UPT IS N
C
      N = 1
      XN = 1.
      III = 0
 5012 CALL TTIME(XN,S3(N), T4,S41,S42,S43,I1,I2,I3A,I3B,I3C, A67, I3D)
C
      IF(P12(N).EQ.0.) GO TO 6000
C
      IF(I1.EQ.21) I1 = 0
      IF((I1 - 1).LE.III) GO TO 5014
      K = I1 - 1
      J = III + 1
      DO 5011 I = J,K
      A16(I) = 0,
      A17(I) = 0.
      A18(I) = 0.
      A19(I) = 0.
 5011 A20(I) = 0.
C
 5014 IF(I1.EQ.0) I1 = 21
      IF(I1.NE.III) GO TO 5016
      A = 0.
      GO TO 5020
C
 5016 AA= A16(I1)*(1.-A21(N))+A17(I1)*(1.-A22(N))+A18(I1)*(1.-A24(N))
      A = AA+ A19(I1)*(1.-A25(N))
      IF(P12(N).GT.A) GO TO 5020
C
C  REDUCE ROTC OUTPUT
C
      A17(I1) = (P12(N)-A+A17(I1)*(1.-A22(N)))/(1.-A22(N))
      IF(A17(I1).GE.0.) GO TO 5030
```

```
      NY = I2 + NBYR
      IF(I2.EQ.21) NY = NBYR
      WRITE(6,5100) NY
 5100 FORMAT(24H1ROTC GRADUATES IN YEAR ,I2,22H NUMBER LESS THAN ZERO)
      GO TO 5030
C
C
C  REQUIREMENT FROM OTS
C
 5020 P = (P12(N) - A)/(1. - A23(N))
      PP13(I2) = PP13(I2) + P
      GO TO 5035
C
C  OTS ENTRANTS
C
 5030 P = 0.
 5035 P14(I3C) = P14(I3C) + P/(1. - A29(I2))
C
      IF(P14(I3C).LE.A65) GO TO 5031
C
C  OTS ENTRANTS IN YEAR I3C EXCEED OTS CAPACITY.
C
      IF(NA66.NE.1) GO TO 5032
C
C  OTS EXPANSION IS ALLOWED
C
      IF(I3D.GT.21) GO TO 5032
C
C  THER IS ENOUGH TIME TO EXPAND OTS
C
      GO TO 5031
C
C  EITHER OTS EXPANSION IS NOT ALLOWED OR THERE IS NOT ENOUGH TIME TO EXPAND.
C
 5032 NN =I3C
      IF(I3C.GT.20) NN= 20 - I3C + 1
      NYEAR = NBYR + NN
      WRITE(6,5033) NYEAR
 5033 FORMAT(38H1OTS ENTRANTS EXCEED CAPACITY IN YEAR ,I2/
     171H EITHER EXPANSION IS NOT ALLOWED OR THERE IS NOT ENOUGH TIME TO
     2 EXPAND.)
C
 5031 IF(I1.EQ.I11) GO TO 6001
C
C  AF ACAD ENTRANTS
C
      P15(I3A) =              A16(I1)/(1. - A27(I2))
C
C  ROTC ENTRANTS
C
      P16(I3B) =              A17(I1)/(1. - A28(I2))
      GO TO 6001
C
 6000 A16(I1) = 0.
      A17(I1) = 0.
      A18(I1) = 0.
```

```
      A19(I1) = 0.
      A20(I1) = 0.
C
 6001 N = N + 1
      XN = XN + 1.
      III = I1
      IF((N + NBYR).LE. NLYR) GO TO 5012
C
C
      N1 = NLYR - NBYR
      IF(I1.EQ.21) I1 = 0
      IF(I1.GE.N1) GO TO 5050
      N2 = I1 + 1
      DO 5040 I = N2,N1
      A16(I) = 0.
      A17(I) = 0.
      A18(I) = 0.
      A19(I) = 0.
 5040 A20(I) = 0.
C
 5050 CALL OUTP(NBYR,NLYR,PP13,P12,P14,P15,P16,A20,ICAP)
C
      RETURN
      END
```

```
      SUBROUTINE READ2(T1,T2,T3,T4,S41,S42,S43,A64,A3,C1, A65,NA66,A67)
C
C  READ TYPE 2 INPUTS
C
 2002 FORMAT(I1,4X,8(F4.0,2X),2(F6.0,1X),F6.0,1X,I1,1X,F4.0)
      READ(5,2002) I, T1, T2, T3, T4, S41, S42, S43, A64,A3,C1,
     1 A65, NA66, A67
C
C
      IF(I.EQ.2) GO TO 3
      WRITE(6,2003)
 2003 FORMAT(36H1'2' CARD IS MISSING FROM INPUT DECK)
      CALL EXIT
C
C
C  CONVERT INPUTS FROM DAYS TO FRACTIONS OF A YEAR.
C
    3 T1= T1/365.
      T2= T2/365.
      T3 = T3/365.
      T4 = T4/365.
      S41 = S41/365.
      S42 = S42/365.
      S43 = S43/365.
      A64 = A64/365.
      A67 = A67/365.
C
```

```
C
      RETURN
      END



      SUBROUTINE READ4
      COMMON/WEAP/ NA7(80), NA10(80), NA11(80), NA12(80)
C
C  READ TYPE 4 INPUTS
C
    1 READ(5,1000) I, NW, I1, I2, I3, I4, IC
 1000 FORMAT(I1,I3,4X,4(I4,4X),39X,I1)
      IF(I.NE.4) GO TO 2
      IF((NW.LT.0).OR.(NW.GT.80)) GO TO 3
      NA7(NW) = I1
      NA10(NW) = I2
      NA11(NW) = I3
      NA12(NW) = I4
C
      IF(IC.EQ.9) RETURN
      GO TO 1
C
C
    2 WRITE(6,1020)
 1020 FORMAT(82H1CARD READ IS NOT A TYPE 4 CARD - CHECK FOR A MISPLACED
     1CARD IN THE TYPE 4 SECTION)
      CALL EXIT
C
C
    3 WRITE(6,1030)
 1030 FORMAT(61H1WEAPON SYSTEM NUMBER ON TYPE 4 CARD EXCEEDS ALLOWABLE N
     1UMBER)
      CALL EXIT
C
C
      RETURN
      END



      SUBROUTINE READ5(NY,NBYR,NW,NTP,IC)
C
      COMMON/DATA/ A1(2,80,3), A2(80,3), A5(2,80,3), A5A(2,80,3),
     1 S1(21,80,3)
C
C  READ TYPE 5 INPUTS
C
      READ(5,1000) I, NYR, NW, NTP, Y1, Y2, Y3, Y4, Y5, Y6, IC
 1000 FORMAT(I1,I3,4X,2(I4,4X),F6.0,4X,3(F6.4,4X),2(F4.0,2X),3X,I1)
C
C
```

```
      IF(I.NE.5) GO TO 4
      N = NYR - NBYR
      IF(N.NE.NY) GO TO 8
      IF((NW.LT.0).OR.(NW.GT.80)) GO TO 9
      IF((NTP.LT.0).OR.(NTP.GT.3)) GO TO 10
      IF(NY.NE.0) GO TO 16
      I1 = 1
      I2 = 21
      GO TO 17
   16 I1 = 2
      I2 = NY
   17 A1(I1,NW,NTP) = Y1
      A2(NW,NTP) = Y2
      A5(I1,NW,NTP) = Y3
      A5A(I1,NW,NTP) = Y4
      IF(NTP.NE.1) RETURN
C
      S1(I2,NW,1)   = Y5/365.
      S1(I2,NW,2)= Y6/365.
      S1(I2,NW,3) = S1(I2,NW,2)
      RETURN
C
C
    4 WRITE(6,1050)
 1050 FORMAT(80H1CARD READ IS NOT A TYPE 5 CARD - CHECK FOR A MISPLACED
     1CARD IN A TYPE 5 SECTION)
      CALL EXIT
C
C
    8 WRITE(6,1051)
 1051 FORMAT(46H1A TYPE 5 CARD DOES NOT CONTAIN THE RIGHT YEAR)
      CALL EXIT
C
C
    9 WRITE(6,1052)
 1052 FORMAT(58H1WEAPON SYSTEM NO. ON TYPE 5 CARD EXCEEDS ALLOWABLE NUMB
     1ER)
      CALL EXIT
C
C
   10 WRITE(6,1053)
 1053 FORMAT(57H1PILOT TYPE NO. ON A TYPE 5 CARD EXCEEDS ALLOWABLE NUMBE
     1R)
      CALL EXIT
C
C
      END



      SUBROUTINE READ7(NBYR)
      COMMON/INFO1/ A16(25), A17(25), A18(22), A19(22),
     1  A27(22), A28(22), A29(22)
C
```

```
C  READ TYPE 7 INPUTS
C
      DO 2 I = 1,25
      A16(I) = 0.
    2 A17(I) = 0.
C
      NYR = NBYR
    1 READ(5,20) I, NY, X1, X2, X3, X4, X5, X6, X7, X8, IC
   20 FORMAT(I1,3X,I2,5(F6.0,4X),3(F4.3,2X),5X,I1)
      IF(I.NE.7) GO TO 10
      IF(NY.NE.NYR) GO TO 11
      NY = NY - NBYR
      IF(NY.EQ.0) NY = 21
      A16(NY) = X1
      A17(NY) = X2
      A18(NY) = X3
      A19(NY) = X4
      A27(NY) = X6
      A28(NY) = X7
      A29(NY) = X8
C
C
      IF(IC.EQ.9) RETURN
      NYR = NYR + 1
      GO TO 1
C
   10 WRITE(6,1000)
 1000 FORMAT(82H1CARD READ IS NOT A TYPE 7 CARD - CHECK FOR A MISPLACED
     1CARD IN THE TYPE 7 SECTION)
      CALL EXIT
C
   11 WRITE(6,1001)
 1001 FORMAT(46H1A TYPE 7 CARD DOES NOT CONTAIN THE RIGHT YEAR)
      CALL EXIT
C
      END



      SUBROUTINE READ8(NBYR)
C
      COMMON/INFO2/ A21(21), A22(21), A23(21), A24(21), A25(21), A26(21)
C
C  READ TYPE 8 INPUTS
C
      NYR = NBYR + 1
    1 READ(5,20) I, NY, X1, X2, X3, X4, X5, X6, IC
   20 FORMAT(I1,3X,I2,6(F4.3,2X),37X,I1)
      IF(I.NE.8) GO TO 10
      IF(NY.NE.NYR) GO TO 11
      NY = NY - NBYR
      A21(NY) = X1
      A22(NY) = X2
      A23(NY) = X3
```

```
      A24(NY) = X4
      A25(NY) = X5
      A26(NY) = X6
C
C
      IF(IC.EQ.9) RETURN
      NYR = NYR + 1
      GO TO 1
C
   10 WRITE(6,1000)
 1000 FORMAT(82H1CARD READ IS NOT A TYPE 8 CARD - CHECK FOR A MISPLACED
     1CARD IN THE TYPE 8 SECTION)
      CALL EXIT
C
   11 WRITE(6,1001)
 1001 FORMAT(46H1A TYPE 8 CARD DOES NOT CONTAIN THE RIGHT YEAR)
      CALL EXIT
C
      END



      SUBROUTINE CROSS(A6,P3,P1,   P,IC,IFLAG)
C
C  DETERMINE WHETHER CROSS TRAINING REQUIREMENT P3 CAN BE FILLED
C  BY A GIVEN SOURCE OF PILOTS NUMBERING P1.  IF IFLAG = 0, THE SOURCE
C  IS EITHER FIGHTER OR BOMBER/CARGO.  IF IFLAG = 1, THE SOURCE IS
C  DESK JOBS.
C
      PP = P3/(1. - A6) - P1
      IF(PP.LE.0.) GO TO 10
C
C  THE CROSS TRAINING REQUIREMENT CANNOT BE COMPLETELY FILLED BY THE
C  GIVEN SOURCE.  USE THE P1 PILOTS.  RETURN TO THE MAIN ROUTINE TO
C  DETERMINE THE NEXT PREFERRED SOURCE TO FILL THE DEFICIT.
C
      P3 = P3 - P1*(1. - A6)
      P = P1
      P1 = 0.
      IC = 2
      RETURN
C
C
C  THE CROSS TRAINING REQUIREMENT CAN BE COMPLETELY FILLED BY THE
C  GIVEN SOURCE.
C
   10 IF(IFLAG.EQ.1) GO TO 15
C
C  THE GIVEN SOURCE IS EITHER FIGHTER OR BOMBER/CARGO.
C
      P1 = P1 - P3/(1. - A6)
      GO TO 20
C
C  THE GIVEN SOURCE IS DESK JOBS.
```

```
C
   15 P1 = P1 - P3
   20 P = P3/(1. - A6)
      IC = 1
      RETURN
      END



      SUBROUTINE OUTP(NBYR,NLYR,PP13,P12,P14,P15,P16,A20,ICAP)
      COMMON/INFO1/ A16(25), A17(25), A18(22), A19(22),
     1  A27(22), A28(22), A29(22)
      DIMENSION PP13(1), P12(1), P14(1), P15(1), P16(1), ICAP(1),A20(22)
C
      WRITE(6,10)
   10 FORMAT(1H1,45X,40HPILOT MODEL OUTPUT - COMMISSION TRAINING//
     1 3HOYR,5X,16HAF ACAD ENTRANTS,5X,17HAF ACAD GRADUATES,5X,
     2 13HROTC ENTRANTS,5X,14HROTC GRADUATES,5X,12HOTS ENTRANTS,5X,
     3 13HOTS GRADUATES/)
C
      N = 25
   30 NYR = NBYR - (N - 21)
   15 WRITE(6,20) NYR,P15(N),A16(N),P16(N),A17(N),P14(N),PP13(N)
   20 FORMAT(1HO,I2,9X,F9.2,12X,F9.2,11X,F9.2,10X,F9.2,9X,F9.2,
     1 8X,F9.2)
      IF(N.LE.20) GO TO 25
      N = N - 1
      IF(N.GT.20) GO TO 30
      N = 0
      NYR = NBYR
   25 N = N + 1
      NYR = NYR + 1
      IF(NYR.GT.NLYR) GO TO 50
      GO TO 15
C
   50 WRITE(6,100)
  100 FORMAT(1H1,38X,55HPILOT MODEL OUTPUT - ENTRANTS INTO UPT FROM SIX
     1SOURCES//3HOYR,4X,7HAF ACAD,6X,4HROTC,6X,3HOTS,5X,10HRATED OFF.,
     2 4X,9HNON-RATED,4X,6HOTHERS,4X,9HTOTAL UPT,4X,9HTOTAL UPT,4X,
     3 13HUPT EXPANDED /55X,4HOFF.,17X,8HENTRANTS,6X,5HGRADS/)
C
      N = 21
      NYR = NBYR
  120 SUM = A16(N) + A17(N) + A18(N) + A19(N) + A20(N) + PP13(N)
C
      IF(ICAP(N).NE.1) GO TO 125
C
      WRITE(6,121) NYR,A16(N),A17(N),PP13(N),A18(N),A19(N),A20(N),
     1 SUM,P12(N)
  121 FORMAT(1HO,I2,3X,F9.2,2X,F9.2,1X,F9.2,2X,F9.2,5X,F9.2,2X,F9.2,
     2 3X,F9.2,4X,F9.2,9X,3HYES)
      GO TO 130
C
  125 WRITE(6,126) NYR,A16(N),A17(N),PP13(N),A18(N),A19(N),A20(N),
```

```
     1 SUM,P12(N)
  126 FORMAT(1H0,I2,3X,F9.2,2X,F9.2,1X,F9.2,2X,F9.2,5X,F9.2,2X,F9.2,
     2 3X,F9.2,4X,F9.2,10X,2HNO)
C
  130 IF(N.EQ.21) N = 0
      N = N + 1
      NYR = NYR + 1
      IF(NYR.GT.NLYR) RETURN
      GO TO 120
C
      END



      SUBROUTINE OUTPUT(NBYR,NLYR,NWPN)
      COMMON/SAVE/ PTG(80,21), P8S(80,21), P9S(80,21), P10S(80,21),
     1 P11S(80,21)
      DO 100 I = 1,NWPN
      WRITE(6,10) I
   10 FORMAT(1H1,45X,41HPILOT MODEL OUTPUT - PILOTS ENTERING CCTS/58X,
     1 14HWEAPON SYSTEM ,I2//)
      WRITE(6,11)
   11 FORMAT(3HOYR,4X,8HFROM UPT,4X,16HFROM SIMILAR A/C,4X,19HFROM DISSI
     1MILAR A/C,4X,14HFROM DESK JOBS,4X,14HTOTAL ENTRANTS,4X,
     2 15HTOTAL GRADUATES/)
C
      J = 0
    5 IF(J.EQ.0) J = 21
      SUM=P8S(I,J)+P9S(I,J)+P10S(I,J)+P11S(I,J)
      IF(J.EQ.21) GO TO 6
      NYEAR = NBYR + J
      WRITE(6,12) NYEAR,P11S(I,J),P8S(I,J),P9S(I,J),P10S(I,J),SUM,
     1 PTG(I,J)
   12 FORMAT(1HO,I2,3X,F9.2,8X,F9.2,13X,F9.2,10X,F9.2,10X,F9.2,9X,F9.2)
      GO TO 7
    6 WRITE(6,12) NBYR,P11S(I,J), P8S(I,J), P9S(I,J), P10S(I,J), SUM
    7 IF(J.EQ.21) J = 0
      J = J + 1
      IF((J + NBYR).GT.NLYR) GO TO 100
      GO TO 5
  100 CONTINUE
      RETURN
      END



      SUBROUTINE TTIME(XN,S3,T4,S41,S42,S43,I1,I2,I3A,I3B,I3C,A67,I30)
C
    1 X1 = XN - S3
      IF(X1.LE.0.) GO TO 5
      I1 = INT(X1 + .5)
      IF(I1.EQ.0) I1 = 21
```

ERIC Clearinghouse

JUL 1 1971

on Adult Education

```
      GO TO 6
    5 X11 = -X1
      I1 = INT(X11 + .5) + 21
C
C   I1 IS THE BEGINNING YEAR OF UPT
C
    6 X2 = X1 - T4
      IF(X2.LE.0.) GO TO 7
      I2 = INT(X2 + .5)
      IF(I2.EQ.0) I2 = 21
      GO TO 8
    7 X21 = -X2
      I2 = INT(X21 + .5) + 21
C
C   I2 IS THE ENDING YEAR OF COMMISSION TRAINING
C
    8 X3A = X2 - S41
      IF(X3A.LE.0.) GO TO 9
      I3A = INT(X3A + .5)
      IF(I3A.EQ.0) I3A = 21
      GO TO 10
    9 X31 = -X3A
      I3A = INT(X31 + .5) + 21
C
C   I3A IS THE FIRST YEAR OF AF ACAD TRAINING
C
   10 X3B = X2 - S42
      IF(X3B.LE.0.) GO TO 11
      I3B = INT(X3B + .5)
      IF(I3B.EQ.0) I3B = 21
      GO TO 12
   11 X31 = -X3B
      I3B = INT(X31 + .5) + 21
C
C   I3B IS THE FIRST YRAR OF ROTC TRAINING
C
   12 X3C = X2 - S43
      IF(X3C.LE.0.) GO TO 13
      I3C = INT(X3C + .5)
      IF(I3C.EQ.0) I3C = 21
      GO TO 14
   13 X31 = -X3C
      I3C = INT(X31 + .5) + 21
C
C   I3C IS THE FIRST YEAR OF OTS TRAINING
C
   14 X3D = X3C - A67
      IF(X3D.LE.0.) GO TO 15
      I3D = INT(X3D + .5)
      IF(I3D.EQ.0) I3D = 21
      GO TO 16
   15 X31 = -X3D
      I3D = INT(X31 + .5) + 21
C
C   I3D IS THE FIRST YEAR OF OTS IF OTS IS EXPANDED
C

   16 RETURN
      END
```

ERIC Clearinghouse

JUL1 1971

on Adult Education